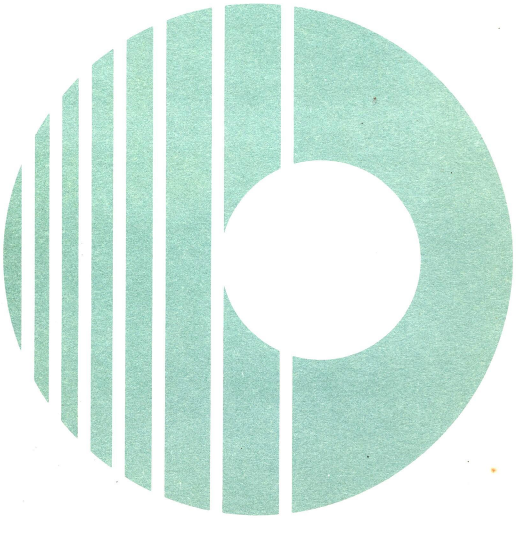
DOT

TECHNICAL SERVICE MANUAL FOR DOT™ PERSONAL COMPUTER



TECHNICAL SERVICE MANUAL

FOR

DOT^{TM} PERSONAL COMPUTER

SERVICE MANUAL
PART NUMBER
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FOREWORD

This manual contains information for use by qualified technicians to install, operate, and maintain Computer Devices, Inc., Model 3000 Personal computers. Unless otherwise noted, descriptions and instructions apply to all Model 3000 instruments.

When customized terminals are supplied by special order, special instructions as appropriate will be furnished to supplement this manual.

SAFETY PRECAUTIONS

OPERATING THE DOT™ PERSONAL COMPUTER WITH THE UPPER HOUSING REMOVED EXPOSES THE USER TO POTENTIALLY HAZARDOUS VOLTAGES UNDER CERTAIN ABNORMAL CONDITIONS. THESE HAZARDOUS VOLTAGES MAY CONTINUE TO EXIST AFTER POWER IS DISCONNECTED DUE TO CHARGES RETAINED BY CAPACITORS. THE MANUFACTURER, THEREFORE, URGES OPERATING AND MAINTENANCE PEOPLE TO OBSERVE ALL SAFETY RULES THAT APPLY FOR WORKING ON HIGH VOLTAGE EQUIPMENT AND SPECIFICALLY TO REMOVE POWER AND GROUND ALL CIRCUITS BEFORE MAKING CONTACT.

USE COMPUTER DEVICES, INC., APPROVED TYPE C THERMAL PAPER ONLY IN THE PRINTER ASSEMBLY. SUBSTITUTION OF NON-APPROVED TYPE THERMAL PAPER CAN DAMAGE THIS COMPUTER AND WILL VOID THE WARRANTY.

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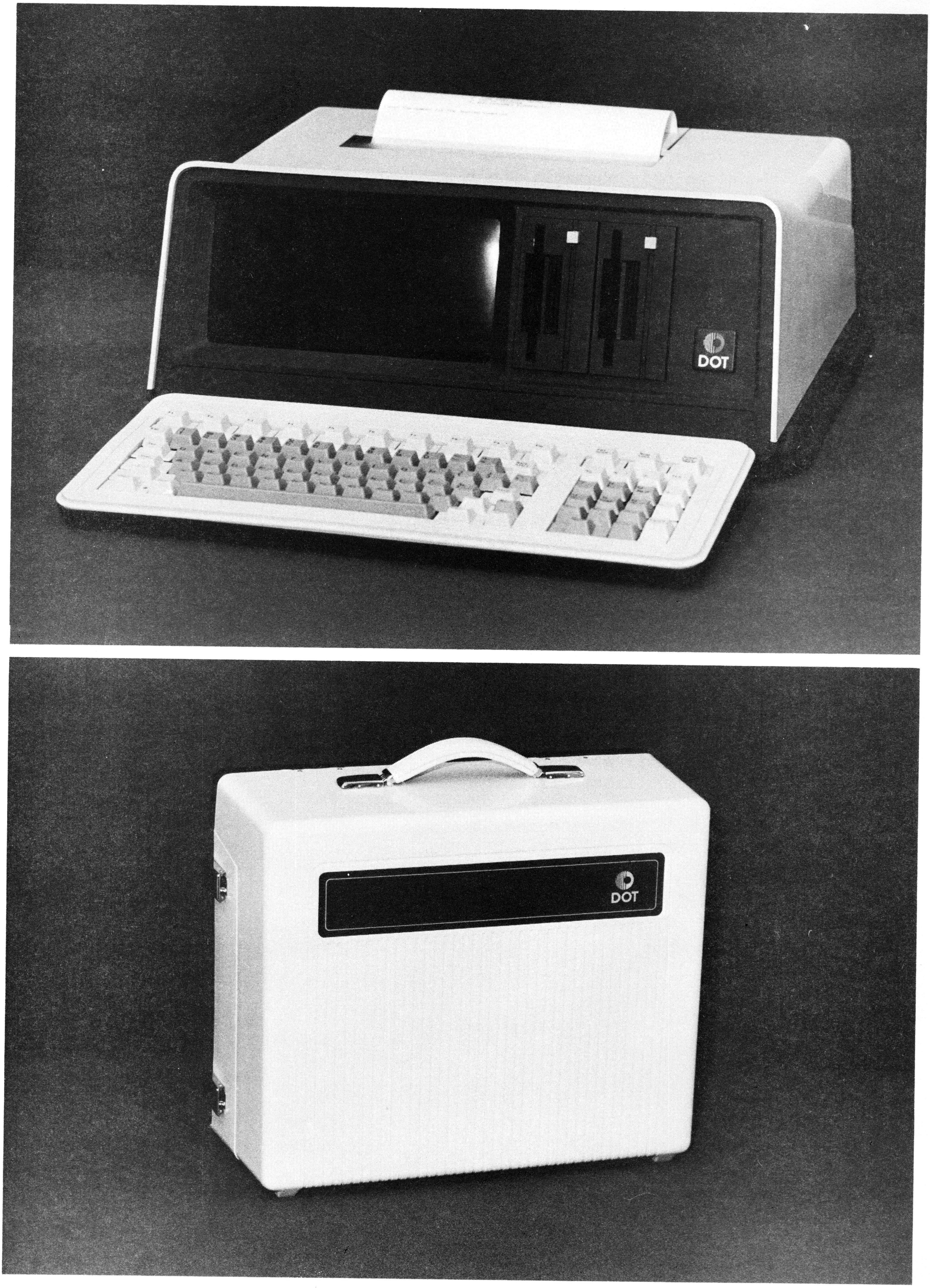


Figure 1-1. DOT^{TM} Personal Computer and Accessories.

SECTION I

GENERAL INFORMATION

1.1. INTRODUCTION.

1-2. This manual contains service information for the DOT™ Personal Computer (Figure 1-1) manufactured by Computer Devices Inc. Information required to operate the Computer is available in separate operating documents supplied with the instrument. Additional information required to service any other equipment used with the Computer should be obtained from the equipment manufacturer.

NOTE

The paper supplied with the optional Computer printer has been designed to work with the high speed printhead and the printer mechanism. Computer Devices Inc., guarantees the performance of the printer only when used with the recommended paper (Type C).

WARNING

THIS COMPUTER SHOULD BE SERVICED BY QUALIFIED PERSONNEL ONLY.

1-3. Service data is included under the following main categories:

SECTION I, GENERAL INFORMATION - Gives a general description of the Computer and the function thereof and includes data on specifications, accessories and options.

SECTION II, INSTALLATION - Supplies any important service-oriented installation information not included in the operating manual.

SECTION III, OPERATION - Supplies any specialized service-oriented operating instructions not included in the operating manual.

SECTION IV, THEORY OF OPERATION - Continues a functional description of the Computer circuitry and software operation.

SECTION V, MAINTENANCE - Provides checks to verify proper Computer operation. Also provides adjustment procedures to properly adjust and align the Computer circuitry after repairs are made. In addition, contains troubleshooting information to aid in isolating a malfunction to a circuit board or assembly and includes the required preventive maintenance.

SECTION VI, REPLACEABLE PARTS AND CIRCUIT DIAGRAMS - Provides part numbers and ordering information for all replaceable parts and assemblies on the Computer. Also includes parts location diagrams and schematics for the main assemblies.

SECTION VII, DIAGNOSTIC PROCEDURES AND ERROR MESSAGES - Includes diagnostic information to aid the service person in using the diagnostics to solve hardware and software problems with the Computer.

SECTION VIII, SUPPLEMENTARY INFORMATION - Supplies any additional information to aid the service person in the maintenance of the Computer.

1-4. GENERAL DESCRIPTION.

1-5. The DOT™ Computer is a small portable stand-alone business oriented computer system. It provides the user with built-in video display, keyboard, and can include an optional high speed printer and a modem which permits two way data communication between the user and a compatible remote central computer time sharing system. Coupling is accomplished by using a direct connection to a telephone line through a common telephone RJ-11 modular connector and an internal modem. The Computer can also be hard-wired directly to a nearby central computer system (within 50 feet) using a multiwire cable connection from the RS-232-C output or to computer peripheral equipment such as a letter quality printer or a larger screen video display using a connection to the external monitor output.

1-6. INSTRUMENT IDENTIFICATION.

1-7. Computer Devices Inc., uses an alpha-numeric and a numeric system to identify the Computer model and the options included. In the alpha-numeric system the first four digits (the part number prefix) is the model number for an instrument that includes all the basic assemblies for that model. This prefix number is followed by a letter that represents most of the optional features incorporated into the Computer. The position and identification of the letters used is shown in Figure 1-2. The numeric system uses a five digit number followed by a dash (-) and a two digit number that is equivalent to a specific alpha-numeric model number. This method of identification is shown in the configuration guide in Section VI. Either of these systems of identification may be used on a Computer. This service manual applies to all Computers with a model number prefix of 3000 or 160XX ("XX" represents the identifying numbers of a particular model).

1-8. SPECIFICATIONS.

1-9. Table 1-1 lists specifications for the Personal Computers.

1-10. ACCESSORIES.

1-11. The supplied instrument accessories are described and are listed with the Computer Devices part number in Table 1-2. Accessories available include all those listed in Table 1-2.

1-12. OPTIONS.

1-13. Table 1-3 lists and describes the options that may have been supplied with the instrument. The additional options that are included in each version of the instrument are listed by option number on the rear panel.

1-14. DOCUMENTATION CONVENTIONS.

1-15. The following conventions are used in this technical manual to describe the instrument displays and controls and the operators actions when performing routines.

a) UNDERLINED type indicates information that the operator enters into the computer through the Keyboard Assembly. Do not type in the underline.

b) When a key with a keyname is to be pressed, such as "RETN" or "BACK SPACE", the keyname is shown as it appears on the keyboard and is enclosed in brackets. For example, to indicate that the key labeled "BACK SPACE" must be pressed, the manual text will read press [BACK SPACE] at the proper place in the procedure.

c) When a control sequence must be entered to perform a special computer operation, the key labeled "CTRL" must be held down while other keys are pressed. In the procedures of this document the operation required will be shown by enclosing the complete control sequence in brackets. For example, perform control sequence [CTRL - X] means to hold down the "CTRL" key while pressing the "X" key.

d) When any text messages or prompt's that appear on the video display are described in the procedures of this manual they will appear in the text exactly as they appear on the display. For example, the "A" prompt will appear as A: in a procedure.

e) All panel nomenclature used on the exterior panels of the computer will appear in the text of this manual exactly as the nomenclature appears on the instrument. Switch or control positions will be as shown on the part except that quotation marks will be used. For example, place the rotary switch to the "2" position would mean to set a switch pointer at the number 2 position on a mounting panel. All circuit board control and switch designations described in text will also use this convention.

SPECIFICATIONS

DRAM/ROM Board Assembly

The central processor board contains the primary processor and system memory

Components:

- 8088 CPU
- 8284 clock generator
- 8288 bus controller
- 256K bytes of dynamic RAM with parity (4 banks of 64K bytes/system memory)

Provision for up to 64K bytes of ROM (24K bytes user ROM)

2K bytes of static RAM memory (instrument configuration) with battery backup

Provision for 8087 numeric data processor

Battery for configuration RAM and clock calendar

CRT Controller Board Assembly

This board contains control logic to provide monochrome alphanumeric and bit-mapped graphics capabilities. The board drives the integral 5 x 9 inch monitor and can appropriate external monitor.

Components:

- 6845 display controller
- horixontal and vertical sync timing
- address of data in video RAM for display
- 6 by 7 character in an 8 X 10 cell
- 6 by 11 character in an 8 x 16 cell

32K bytes of dynamic RAM

Character Mode

- 16K RAM for data - 8 screens
- 16K RAM for attributes

Graphics Mode

- 32K RAM for graphic data

Timing Logic

- 80 or 132 column mode
- 6845 video display controller

Attribute Logic

- character mode only - blink, blank, reverse video, highlight, underscore, and overscore

Table 1-1. Computer Specifications (Sheet 1 of 6).

SPECIFICATIONS (con't)

I/O Mother Board Assembly

This board contains system control and peripheral interface logic.

Components:

- 765A floppy disk controller
    - controls disk drives
    - interface to system bus and disk drives
- 8259A interrupt controller
    - 8 interrupt request lines: floppy disk, system timer, keyboard/printer USART, RS-232 serial port USART, parity error
- 8237 DMA controller
    - 4 channels; dynamic memory refresh, floppy disk, two (2) unassigned channels
- Z80B CPU for CP/M™ 2.2
- 7201 dual channel USART's
    - 2 channels; RS-232-C serial ports
- 8253-5 timer/counter
    - BAUD rate for 7201 USART serial ports
- 8253-5 timer/counter
    - system timer
    - tone generator frequencies additional BAUD rate for 7201 USART
- 8255 peripheral interface
    - control for clock/calendar chip and miscellaneous I/O
- Two option card slots
    - (expansion)
- Time of day clock
    - time and date - battery supported

Printer Control Board

Contains a one-chip microprocessor and circuits for bidirectional alphanumeric or graphics printing with the printer mechanism.

Components:

- 8031 CPU
    - microprocessor to control printer
- 16K ROM
    - two eight-byte chips containing the program for mechanism control and printhead timing
- 4K RAM
    - print buffer
- 8155 peripheral interface
    - one output port for carriage and line feed motors;
    - two outboard ports used to control printhead -11 dots

Table 1-1. Computer Specifications (Sheet 2 of 6).

SPECIFICATIONS (con't)

Disk Drives

Description:
- 3.5 inch drive, single sided/double density

Capacity:
- Unformatted - 437.5K bytes
- Formatted - 280K bytes

Format:
- 512 bytes/sector
- 8 sectors/track
- 70 tracks

Access time:
- Track to track - 15msec
- Average - 365 msec
- Latency - 50 msec

Functional:
- Rotational Speed - 600 rpm
- Recording density - 7610 bpi
- Track density - 135 tpi
- Transfer rate - 500K bits/second

Error rate:
- Soft read error - 1 x 10^{9} bits read
- Hard read error - 1 x 10^{12} bits read

Video Display Monitor

Size:
- 5 inches high by 9 inches wide, white phosphor - low profile; anti-glare green and amber display options

Phosphor:
- P4 (white)

Character mode:
- 80 characters x 25 lines
- 80 characters x 16 lines
- 132 characters x 25 lines
- 132 characters x 16 lines

Graphics mode:
- 40 characters x 25 lines
- 40 characters x 16 lines
- 320 wide x 254 high
- 640 wide x 254 high
- 512 wide x 254 high
- 1024 wide x 254 high

Keyboard Assembly

Ninety key keyboard:
- Function keys;10
- Alpha/numeric 59
- Numeric pad: 18
- Control keys: 3

Table 1-1. Computer Specifications (Sheet 3 of 6).

Printer Assembly

Print method:
    Thermal with a 5 x 10 dot matrix
Print speed:
    160 cps; bidirectional
Paper:
    8 1/4" wide, thermal paper: 150' or 100' roll with the last 5' color coded
Line length (characters)
    80/132 columns, selectable
Automatic carriage return and line feed;
    At 81st or 132th column
Character spacing;
    Vertical - 6 lines/inch
    Horizontal - 80 column; 10.7 characters/inch
                 132 column; 18.4 characters/inch
Graphics density:
    Vertical - 64 dots/inch
    Horizontal - 64 or 128 dots/inch
Paper feeds:
    Friction drive

Communications

300 BAUD modem;
    Asynchronous/synchronous, auto-answer, auto-dial, RJ-11
300/1200 BAUD modem:
    Asynchronous/synchronous, auto-answer auto-dial, RJ-11
Terminal communications;
    Dumb terminal emulator (to access Dow Jones, new services etc)
    IBM 327X
    IBM 3780
Two RS-232 serial ports
Port for external video monitor

Physical Characteristics

Base unit:
    Width - 18"
    Depth - 14.75"
    Height - 7.5"
    Weight - 26 lbs. (approximately)
Keyboard:
    Width - 16.75"
    Depth - 7.75"
    Height - 1.5"
    Weight - 2.5 lbs. (approximately)

Table 1-1. Computer Specifications (Sheet 4 of 6).

SPECIFICATIONS (Con't)

Carrying Case;
    Width - 18"
    Depth - 15"
    Height - 8.5"
    Weight - 2.25 lbs (Approximate)
Total weight with carrying case: 31 lbs (Approximate)

Power

Average Consumption:
    100 watts
Switch selectable:
    110 volts (US) or 220 volts (Europe)
Nominal output voltages: (Power Supply Assembly)
    +5 volts - logic
    +12 volts - video display disk drives, RS-232 serial port
    -12 volts - RS-232 serial port
    +13.5 volts - printhead
    +17 volts - printer carriage and line feed motors
    +4.5 volts - printer motor (idle mode)

Temperature

Operating: +50°F to +95°F (10°C to 35°C)
Non Operating: -40°F to +140°F (-40°C to +60°C)
Storage: +15°F to +120°F (-9°C to +49°C)

Humidity

Operating and Non Operating: 10% to 80%.

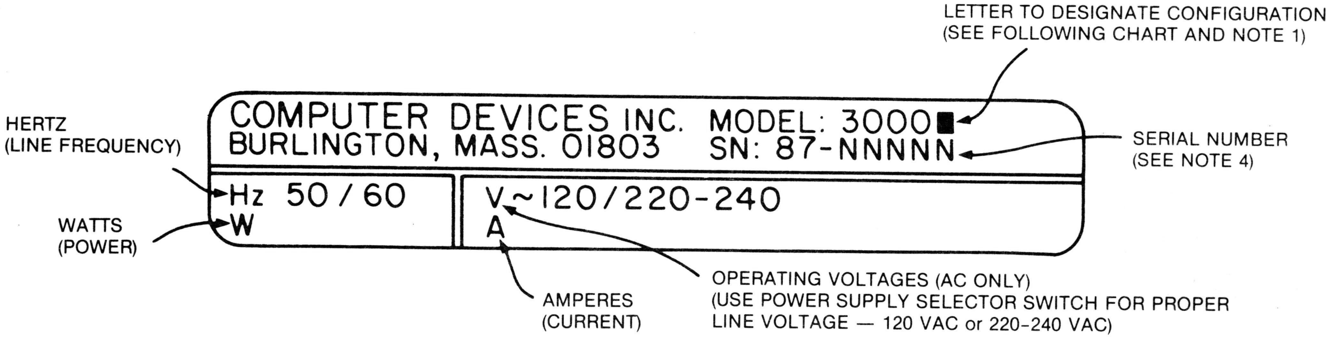
Table 1-1. Computer Specifications (Sheet 5 of 6).

RAM REQUIREMENTS

FOR VIABLE SOFTWARE OFFERINGS

PRODUCT	MINIMUM CONFIGURATION	RECOMMENDED
MS-DOS VER 1.25	64K	128K
VER 2.0	128K	
LANGUAGES		
MBASIC		64K
GWBASIC	128K	
BASIC COMPILER	64K	256K
MACRO ASSEMBLER	128K	
MS-COBOL	128K	
MS-FORTRAN	128K	
MS-PASCAL	128K	
APPLICATIONS		
MULTIPLAN	128K	
VOLKSWRITER	128K	
TIME MANAGER	128K	
RECORD MANAGER	128K	
REPORT MANAGER	128K	
PROJECT MANAGER	128K	
ACCOUNTING PEARL	64K	128K
PERSONAL PEARL	64K	128K
PEARL LEVEL III	64K	128K
IBM 3270 Emulator	128K	
IBM 3780 Emulator	64K	
Z-80 And CP/M	64K	
Diagnostic Kit	64K	
IBM to DOT, DOT To IBM File Transfer	64K	

Table 1-1. Computer Specifications (Sheet 6 of 6).


LETTER TO DESIGNATE CONFIGURATION (SEE FOLLOWING CHART AND NOTE 1)
COMPUTER DEVICES INC. MODEL: 3000■
BURLINGTON, MASS. 01803 SN: 87-NNNNN
SERIAL NUMBER (SEE NOTE 4)
HERTZ (LINE FREQUENCY)
Hz 50 / 60
W
WATTS (POWER)
V~120/220-240
A
AMPERES (CURRENT)
OPERATING VOLTAGES (AC ONLY) (USE POWER SUPPLY SELECTOR SWITCH FOR PROPER LINE VOLTAGE — 120 VAC or 220-240 VAC)

INSTRUMENT FEATURES	MODEL NUMBERS 3000A	3000B	3000C	3000D	3000E
8088	X	X	X	X	X
64K bytes memory	X				
128K bytes memory		X	X		
256K bytes memory				X	X
clock	X	X	X	X	X
5X9 inch monitor with bit-map graphics	X	X	X	X	X
one 3 1/2" floppy drive (280K bytes formatted)	X				
two 3 1/2" floppy drives (560K bytes formatted)		X	X	X	X
Keyboard	X	X	X	X	X

Figure 1-2. Instrument Model Number And Option Identification (Sheet 1 of 2).

	MODEL NUMBERS				
INSTRUMENT FEATURES	3000A	3000B	3000C	3000D	3000E
external monitor port (sep. sync)	X	X	X	X	X
90-day warranty	X	X	X	X	X
two option slots	X	X	X	X	X
32K dedicated screen RAM	X	X	X	X	X
two RS-232-C ports with asynchronous termianl emulator		X	X	X	X
Basic Software Kit (MS-DOS, BASIC, and DOT documentation		X	X	X	X
Integral 160 cps printer			X		X

NOTES:

1. See Table 1-3 for additional options that may be included in or with the equipment.
2. Configuration A is available for OEM's only.
3. X Means Model listed at top of column includes this feature
4. "NNNNN" equals the five digit sequence number.

Figure 1-2. Instrument Model Number And Option Identification (Sheet 2 of 2).

ACCESSORIES AND SUPPLIES SUPPLIED

ITEM	PART NUMBER	ITEM	PART NUMBER
Paper,100 ft. rolls (case of 24 rolls)	0440-00028	Your Dot File Cabinet, File Editing And House Keeping On the DOT	0008-14615
Meet your DOT, An Introduction to the DOT Computer	0008-14612	Software Vendors List	0008-14617
Business And Fun with BASIC, A Sampler of BASIC	0008-14613	System Diskette w/ three blanks	0008-14732
Programs For the DOT		MSDOS, Reference Manual	0008-14661
Software Decisions, The DOT Guide To Software Selection	0008-14611	BASIC Interpreter And GW BASIC	0008-14662
Connecting the DOT, Using your DOT as A Computer Terminal	0008-14614	Power Cord	0002-14330

ACCESSORIES AND SUPPLIES AVAILABLE

ORDER NUMBER	ITEM
AF100	Monitor Filter - Green
AF110	Monitor Filter - Amber
PAPER	Case 24 - 100 Ft rolls
DISKS	PKG of 10 3-1/2" Diskettes
4RJ11	4-Prong to RJ11 Adapter
DCASE	DOT Traveling Case
DCVER	DOT Dust Covers
Cables:	
CRJ10	RJ11-RJ11 Cable - 10 ft.
CMD05	DOT - Modem Cable - 5 ft.
CMD10	DOT - Modem Cable - 10 ft.
CE105	DOT - EIA Cable - 5 ft.
CE110	DOT - EIA Cable - 10 ft.
CVMON	DOT EXT MON Cable to Bare Wire-10 ft.
C327X	DOT to Coax - 10 ft.
C378X	DOT to Coax - 10 ft.

ORDER NUMBER	ITEM
Basic System Manuals:	
M1000	Meet Your Dot Intro Manual
M1010	Your DOT File Cabinet Manual
M1020	DOT Guide to S/W Selection
M1030	Connect the DOT-Terminal Guide
M1040	Business/Fun With Basic

Table 1-2. Accessories and Supplies.

DOCUMENTATION

Each DOT starter kit (301-308) includes documentation as each of the software packages. Additional sets of documentation are available, as follows:

MODEL NUMBER	OPTION
☐DOC 301	Meet Your DOT: An Introduction To Your DOT Computer
☐DOC 302	Your DOT File Cabinet
☐DOC 303	DOT Guide To Software Selection
☐DOC 305	Business And Fun With BASIC
☐DOC 307	MS-DOS Operating System User's Guide
☐DOC 308	MS-BASIC Language Manual
☐DOC 309	MS-BASIC Compiler Manual
☐DOC 310	MS-FORTRAN Language Manual
☐DOC 311	MS-PASCAL Language Manual
☐DOC 312	MS-COBOL Language Manual
☐DOC 313	MS-DOS MACRO-ASSEMBLER And Utilities Manual
☐DOC 321	Multiplan By Microsoft
☐DOC 322	Volkswriter By Lifetree Software Inc.
☐DOC 323	Time manager By Datamension Corporation
☐DOC 324	Records Manager By Datamension Corporation
☐DOC 325	Project manager By Datamension Corporation
☐DOC 326	Report Manager by Datamension Corporation

The following software programs are trademarks of Microsoft Corporation of Bellevue Washington: MS-DOS, GW BASIC, MS-BASIC COMPILER, MS-FORTRAN, MS-COBOL, MS-PASCAL, MS-MACRO ASSEMBLER, and MULTIPLAN.

Volkswriter is a trademark of Lifetree Software Inc., of Monterey, California.

The Manager Series, Time Manager, Records Manager, Project Manager, Report Manager, and New Dimensions in Data Management are trademarks of Datamension Corporation, of Northbrook, Illinois.

CP/M is a trademark of Digital Research Inc. of Pacific Grove, California.

SYSTEM SOFTWARE

Model Number	Option	Minimum Memory
☐SOF 301	Base Software KIT: MS-DOS(TM), BASIC(TM) Interpreter and documentation (DOC 307 and 308)	64K
☐SOF 308	GW BASIC Interpreter with Graphics	128K
☐SOF 309	Basic Language Compiler	64K
☐SOF 310	FORTRAN Compiler	128K

Table 1-3. Computer Options (Sheet 1 of 3).

SYSTEM SOFTWARE

Model Number	Option	Minimum Memory
[]SOF 311	PASCAL Compiler	128K
[]SOF 312	COBOL Compiler	128K
[]SOF 313	DOT MACRO Assembler	128K
[]SOF 315	IBM 3270 emulator	128K
[]SOF 316	IBM 3780 emulator	128K
[]SOF 317	Z-80, CP/M 2.2 including Z-80, CP/M 2.2 diskette, manual, and single use license	64K
[]SOF 318	Diagnostic kit including manual, diagnostic diskette, two formatted diskettes	64K
[]SOF 319	IBM to DOT, DOT to IBM File transfer utility kit. Includes cable, 3-1/2 inch diskette, 5-1/4 inch diskette software and documentation.	64K

APPLICATION SOFTWARE

Model Number	Option	Minimum Memory
[]APP 321	MULTIPLAN(TM) Spreadsheet From Microsoft	64K
[]APP 322	Volkswriter(TM) From Lifetree	128K
[]APP 323	Time Manager(TM) From Datamension Corp.	128K
[]APP 324	Records Manager(TM) From Datamension	128K
[]APP 325	Project Manager(TM) From Datamension	128K
[]APP 326	Report Manager(TM) From Datamension	128K

These applications all operate under MS-DOS and are distributed by Computer Devices. Other application software that runs on the DOT is available on a referral basis.

DEVELOPMENT KITS

The following options are designed for developers or volume dealers who have selected the DOT-3000A configuration.

Table 1-3. Computer Options (Sheet 2 of 3).

Model Number	Option
☐ OEM 331	DOT MS-DOS BIOS KIT (Includes Documentation) with BIOS licenses
☐ OEM 333	3-1/2 inch Disk Drive
☐ OEM 334	128K Total Memory
☐ OEM 338	Dual RS-232-C Ports with Asynchronous Terminal Emulator.

HARDWARE OPTIONS

SYSTEM PERIPHERALS

ORDER NUMBER	OPTION
☐ PER 301	Integral 160 CPS Printer
☐ PER 302	Parallel Port
☐ PER 303	Intel 8087 Arithmetic Processor

External printers would normally interface to the DOT through the optional parallel port.

MEMORY

ORDER NUMBER	OPTION
☐ MEM 301	Expansion Memory (from 128K to 256K)
☐ MEM 302	Additional 256K Option Card for a total of 512K Memory Instrument must have 256K Memory before installing this option.

COMMUNICATIONS

ORDER NUMBER	OPTION
☐ COM 301	300 Baud Internal Modem with RJ11 (Direct Connection)
☐ COM 302	300/1200 Baud Internal Modem with RJ11 (Direct Connection)

ACCESSORIES

ORDER NUMBER	OPTION
☐ ACC 304	Paper - 100 foot rolls, Case lots only (24 rolls/case)
☐ ACC 305	Diskettes (package of ten)
☐ ACC 307	DOT Travel Case

Table 1-3. Computer Options (Sheet 3 of 3).

SECTION II

INSTALLATION

2-1. GENERAL.

2-2. The Computer installation instructions are included in the operating manuals supplied with the instrument. See Table 1-2 for a list of these documents. Figure 2-1 describes the rear panel controls and connections of the instrument.

> CAUTION
>
> DO NOT OPERATE THE INSTRUMENT WITH THE BOTTOM FRONT VENTS BLOCKED. MAKE SURE THE COOLING AIR CAN ENTER THE FRONT AND SIDES OF THE DOT AND EXIT AT THE REAR (FAN) VENT. BE CAREFUL WHEN OPERATING THE INSTRUMENT WITH COVERS REMOVED. HIGH VOLTAGE IS ACCESSABLE INSIDE OF THE CABINET. ALSO BE CAREFUL WHEN CLEANING OR SERVICING THE VIDEO DISPLAY TUBE. IT MAY IMPLODE IF STRUCK A SHARP BLOW.

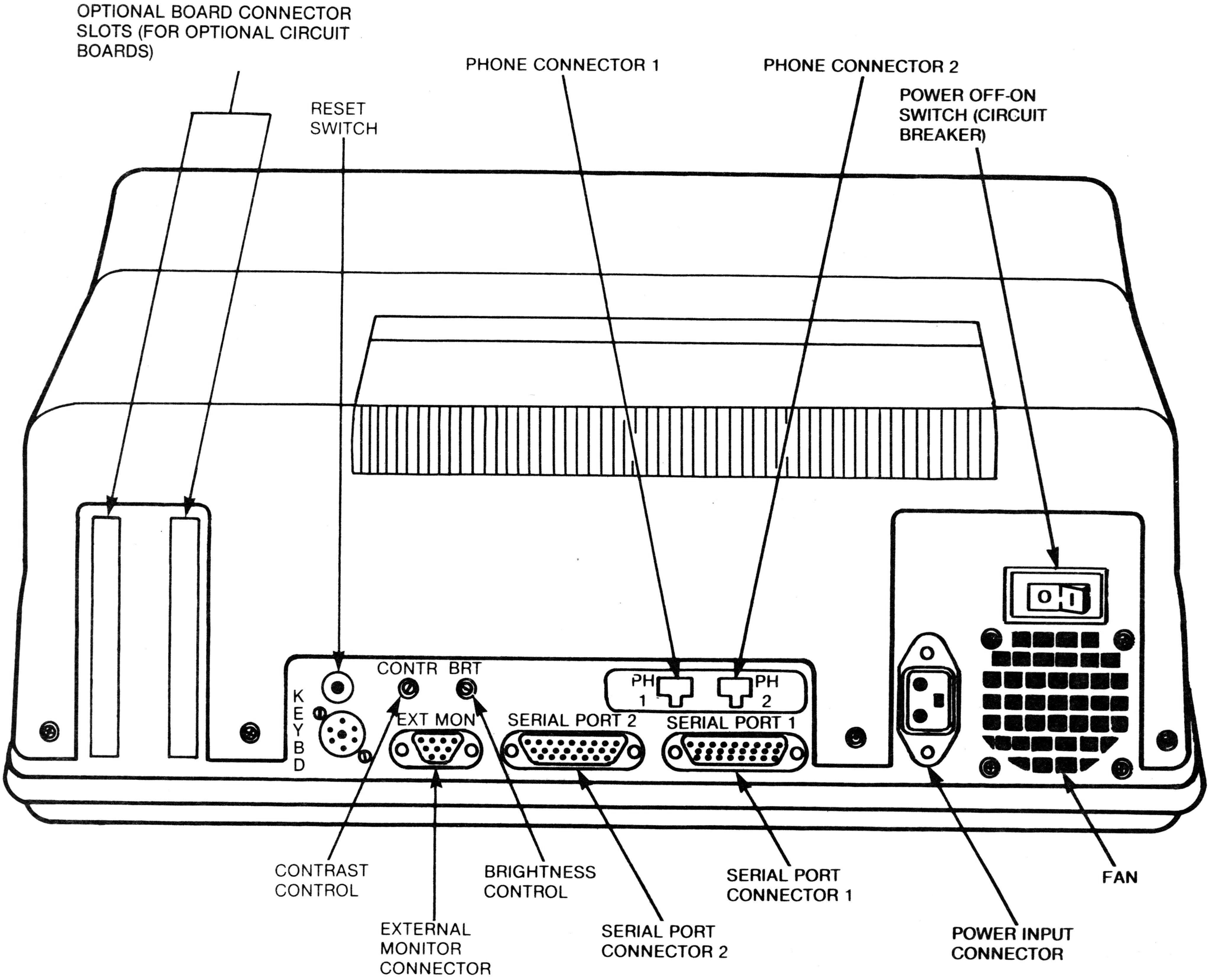
2-3. SPECIAL INSTALLATION INSTRUCTIONS.

> CAUTION
>
> DO NOT INSTALL ANY DISK IN THE DISK DRIVE UNTIL POWER HAS BEEN APPLIED TO THE INSTRUMENT. ALWAYS REMOVE THE DISK FROM THE DISK DRIVE BEFORE TURNING OF THE POWER. MAKE SURE THAT THE RED LAMP ON THE DRIVE FRONT PANEL IS OUT BEFORE REMOVING THE DISK.

2-4. The following instructions and data will aid in special computer installations.

2-5. Special Cable Fabrication.

2-6. Interconnecting cables are required to connect the Computer to external peripherals. These must be constructed using the pin out data of the respective Computer connector and the interface data of the manufacturer of the equipment to be used. Note that the mating plugs for the rear panel jacks on the Computer are not available from Computer Devices. Keep the cables short in all cases.


OPTIONAL BOARD CONNECTOR SLOTS (FOR OPTIONAL CIRCUIT BOARDS)
RESET SWITCH
PHONE CONNECTOR 1
PHONE CONNECTOR 2
POWER OFF-ON SWITCH (CIRCUIT BREAKER)
KEYBD
CONTR BRT
PH 1
PH 2
EXT MON
SERIAL PORT 2
SERIAL PORT 1
CONTRAST CONTROL
BRIGHTNESS CONTROL
SERIAL PORT CONNECTOR 1
FAN
EXTERNAL MONITOR CONNECTOR
SERIAL PORT CONNECTOR 2
POWER INPUT CONNECTOR

Power Off-On Switch	Applies ac power to the Computer
RESET Switch	Resets (initializes) the Computer
KEYBD Connector	Five pin connector for keyboard input/output.
CONTR Control	Potentiometer to adjust video display black to white ratio.
BRT Control	Potentiometer to adjust video display brightness
EXT MON Connector	Nine pin connector for Video display monitor or TV set input/output.
PH1,PH2 Connectors	RJ-11 phone connectors for direct connection to the telephone company lines.
SER PORT 1 and SER PORT 2 Connectors	RS-232-C (25 pin) connectors for input/output to compatible peripheral equipment.
Power Input Connector	AC power input connector.

Figure 2-1. Computer Rear Panel Inputs, Outputs and Controls.

2-7. SER PORT (Serial Port 1 and 2) Connections (RS-232-C)

2-8. The pin identification for the optional Computer Rear Panel RS-232-C connections are as follows:

SERIAL PORT CONNECTOR PIN/SIGNAL DESCRIPTIONS

SERIAL PORT 2 (J6) PIN NO.	SERIAL PORT 1 (J7) PIN NO.	MNEMONICS	DESCRIPTION
1	1	CHAS GND	Chassis Ground
2	2	TxD	Transmit Data (Out)
3	3	RxD	Receive Data (In)
4	4	RTS	Request to Send (Out)
5	5	CTS	Clear to Send (In)
6	6	DSR	Data Set Ready (In)
7	7	SIG GND	Signal Ground
8	8	DCD	Data Carrier Detect (In)
9	9		N/C
10	10		N/C
11	11	SRTS	Secondary Request to Send (Out)
12	12	SRLSD	Secondary Received Line Signal Detector (In)
13	13	SCTS	Secondary Clear To Send (In)
14	14	STXD	Secondary Transmit Data (Out)
15	15	TSET	Transmitter Clock, External (In)
16	16	SRXD	Secondary Receive Data (In)
17	17	RSET	Receiver Clock, External (In)
18	18		N/C
19	19		N/C
20	20	DTR	Data Terminal Ready (Out)
21	21		N/C

SERIAL PORT CONNECTOR PIN/SIGNAL DESCRIPTIONS (con't)

SERIAL PORT 2 (J6) PIN NO.	SERIAL PORT 1 (J7) PIN NO.	MNEMONICS	DESCRIPTION
22	22	RI	Ring Indicator Ring (In)
23	23	SPD	Speed Control (Out)
24	24	TSET	Transmitter Clock, External (Out)
25	25		N/C

2-9. EXT MON (External Monitor) Connection.

2-10. The pin identification for the connector (J12) is as follows:

PIN NO.	MNEMONICS	DESCRIPTION
1	EXT VIDEO	External Video Signal Out
2	GND	Ground
3	EXT V SYNC	External Vertical Sync Signal Out
4	GND	Ground
5	EXT H SYNC	External Horizontal Sync. Signal Out
6	GND	Ground
7	Not Used	-
8	COMBINED TV	Combined Video/Vertical/Horiz Out (Composite Video)
9	GND	Ground

2-11. PH (Phone 1 and 2) Connections (Optional).

2-12. The PH1 and PH2 (RJ-11 Connectors) are part of the Modem option to the Computer. Connections must be made using standard telephone modular plugs and cable. Installation details are shown in Figure 2-2.

2-13. KEYBD (Keyboard) Connection.

2-14. The keyboard connector (J9) includes the following pins.

PIN NO	MNEMONICS	DESCRIPTION
1	KYBD OUT	Serial Data Output
2	KEYBD IN	Serial Data Input
3	KEYBD PWR	+ 5VDC
4	KEYBD GND	Ground Return
5	KEYBD RST	Keyboard Reset (\ = Active Low)

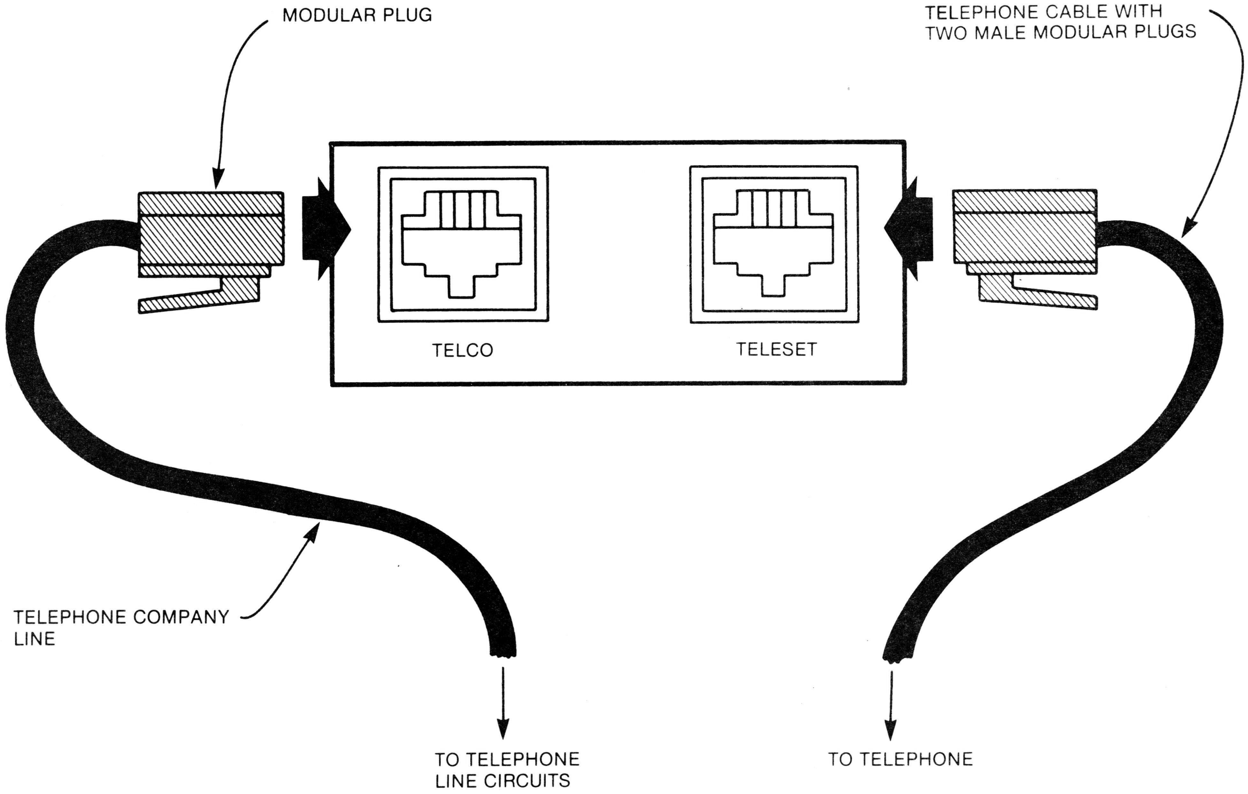

MODULAR PLUG
TELEPHONE CABLE WITH TWO MALE MODULAR PLUGS
TELCO
TELESET
TELEPHONE COMPANY LINE
TO TELEPHONE LINE CIRCUITS
TO TELEPHONE

Figure 2-2. Computer to Telephone Line Direct Modular Jack Connections.

SECTION III

OPERATION

3-1. GENERAL.

3-2. The Computer operating instructions are included in the operating manuals supplied with the instrument. See Table 1-2 for a list of these documents.

CAUTION

DURING COMPUTER OPERATION REMEMBER TO KEEP THE FRONT BOTTOM COOLING VENTS OPEN AND CLEAR. DO NOT OPERATE THE INSTRUMENT ON A SOFT SURFACE WITHOUT MAKING SURE THAT THE FRONT (AND ALL) VENTS ARE NOT BLOCKED. DO NOT PLACE ANY LIQUID CONTAINERS ON THE TOP OF THE DOT CABINET OR KEYBOARD. SPILLED FLUIDS CAN DAMAGE THE INSTRUMENT INTERNAL COMPONENTS.

CAUTION

BE CAREFUL THAT NOTHING FALLS INTO THE PRINTER MECHANISM WHEN CHANGING PAPER OR WHEN PERFORMING ANY MAINTENANCE OPERATION ON THE ASSEMBLY SINCE THE ITEM COULD SLIP THROUGH THE PRINTER FRAME ONTO THE CIRCUIT BOARDS BELOW WHEN THE COMPUTER IS MOVED AND DAMAGE THE CIRCUIT BOARDS. IN PARTICULAR MAKE SURE THAT HARDWARE, WIRES, PAPER CLIPS OR COINS ARE NOT PLACED ON THE TOP OF THE INSTRUMENT WHERE THEY COULD ACCIDENTLY SLIDE OR BE PUSHED INTO THE PAPER ACCESS OPENING.

3-3. SPECIAL OPERATING INSTRUCTIONS.

CAUTION

DO NOT INSTALL ANY DISK IN THE DISK DRIVE UNTIL POWER HAS BEEN APPLIED TO THE INSTRUMENT. ALWAYS REMOVE THE DISK FROM THE DISK DRIVE BEFORE TURNING OFF THE POWER. MAKE SURE THAT THE DISK DRIVE INDICATOR (RED LAMP) IS OFF BEFORE REMOVING THE DISK.

3-4. Special instructions for the Service person for use during an operational checkout of the Computer are supplied in the following paragraphs. Some of the error messages that might appear on the video display while running a program are listed in Section VII.

3-5. Using RS-232 Connections.

3-6. To Be Supplied.

3-7. Using The External Monitor Connector.

3-8. To Be Supplied.

3-9. Using An External Printer.

3-10. To Be Supplied.

3-11. Using An External Modem.

3-12. To Be Supplied.

3-13. Using the Internal Modem.

3-14. To Be Supplied.

3-15. OPERATION.

3-16. Inserting And Removing Disks.

3-17. The following steps describe how to insert and remove disks from the disk drive:

a) Turn on the power before inserting the disk into the computer.

b) Remove the disk from the plastic sleeve.

c) Slide open the disk metal door labeled "SONY Micro Floppydisk Single Side" until the door clicks into place.

d) Hold the disk with thumb on the front of the label and fingers on the back. The cut corner of the disk should be at the top.

e) Slide the disk into the disk drive. Push the disk until it clicks into place and the red indicator lamp lights on the disk drive. The lamp indicates that the disk is properly inserted and ready to use.

NOTE

The Disk Drive indicator lamp will go on and off as data is sent to and from the disk. The lamp lights when the drive is operating.

f) To remove the disk from the disk drive wait until the red indicator lamp goes out, then firmly press the square button on the drive. When the button is pressed properly, the disk pops out.

3-18. Caring For the Disks.

3-19. The disks are valuable once information is entered. Follow the precautions below to protect the disk and to avoid losing stored information.

a. When not using a disk, always close the metal door which protects the exposed oval part of the disk.

b. Do not touch the exposed part of the disk. A small scratch or fingerprint on the disk surface can destroy information.

c. Keep disks away from magnets or objects with magnetic fields such as screwdrivers, paper clips, or power supplies.

d. Keep liquids away from the disks.

e. To avoid putting pressure on the disk, write on one of the sticky labels that come with the disks before attaching it to the disk. (To attach a label, peel off the backing and press the label against the side of the disk marked SONY. Make sure the colored portion of the label covers the top ridge of the disk so the disk can be easily identified.

f. When finished using disks for the day, place back in the plastic sleeves. Store disks vertically with the colored part of the label facing up.

g. Disks operate best within the temperature range of 40° to 115° Fahrenheit (5° to 45° Celsius). Exposing disks to higher or lower temperatures may cause damage to the surface.

h. Always make a backup copy of each working disk at the end of a session or each new system or program disk. The procedures for making a backup copy of a disk are described in the operating instructions included with the instrument.

NOTE

> Although copies of the DOT system disk can be made, do not take advantage of Computer Devices' generosity by making copies for use on other computer systems. The laws against program copying are now expanding to meet the growing threat of software piracy.

3-20. Typical Operating Sequence.

3-21. The following is a short operating routine for the Computer.

a. Power up the instrument.

NOTE

Power-up diagnostics are automatically performed when power is applied to the instrument. Extended diagnostics can also be selected from the initial menu displayed on the screen. See Section VII for additional information on the procedures and the error messages.

b. Insert the disk into drive A.

c. Select the desired operating mode (normally LOAD FROM LEFT DRIVE (A)) from the menu on the Computer video display and press the proper number.

d. Type in the date and time when requested.

e. When the letter prompt appears (A: when loading from drive A) type DIR and press the [RETN] key. This is the directory command and will cause the names of the programs on the system disk to be listed on the display.

The following is a listing of some that might appear. Use the keyboard to type in the name and then press [RETN]. Note that the complete name should be typed and a period (".") used between the two words such as FORMAT.COM

PROGRAM		FUNCTION
COMMAND	COM	File controlling Computer Operation.
FORMAT	COM	Prepares (Initializes) Diskette for Copy. Initializes the diskette in the designated or default drive to a recording format acceptable to DOS; analyzes the entire diskette for any defective tracks; and prepares the diskette to accept DOS files by initializing the directory.
DEBUG	COM	Used to provide a controlled test environment so you can monitor and control the execution of a program to be debugged. Problems in the program can be fixed directly, and then the program can be executed immediately to determine if the problems have been resolved. Reassembling a program to find out if the changes worked is not necessary.
EDLIN	COM	Line Text Editor to delete, edit, insert, and display lines.
CHKDSK	COM	Analyzes the directory and the File Allocation Table on the designated or default drive and produces a diskette and memory status report.
SYS	COM	Transfers the hidden operating system files from the default drive to the specified drive.
FILCOM	COM	Compares contents of one file to that of another.
EXE2BIN	EXE	Converts .EXE files which have no segment fixup to a form that is compatible with .COM programs. This results in a saving of diskette space and faster program loading.

PROGRAM		FUNCTION
LINK	EXE	Combines separately produced object modules. Searches library files for definitions of unresolved external references. Resolves external cross-references. Produces a printable listing that shows the resolution of external references and error messages. Produces a relocatable load module.
MASM	EXE	Macro Assembler
REMOTE	COM	Permits communication link between IBM PC and the DOT Computer
LIB	EXE	Library Manager
CREF	EXE	Cross referenced listing generator for MASM Assembler
BASIC	COM	BASIC Programming language interpreter

f. Some of the control operating sequences for the Computer are as follows:

1. To format a disk in a two drive system:

   A:FORMAT B:/S then press [RETN]

2. To copy all visible files from disk A to B in a two drive system:

   A:COPY *.* B: then press [RETN]

3. To switch the default drive from A to B in a two drive system:

   A:DIR B: then press [RETN]

   This will give the directory in the B disk drive,

   Then A:B: and press [RETN]

4. To cause the Printer Assembly (optional) to print out the video display and/or the keystrokes from the Keyboard Assembly:

   A: [CTRL P]
   Press [CTRL N] to delete this function

5. To reconfigure the video display and communication parameters, perform the following routine:

   a) Press [ALT-ESC] to display the configuration menu.
   b) Make the desired changes on the configuration menu. Use the following information to set the parameters.

DOT SET-UP HELP MENU

Key	Function:
F2	Recall Operation
F7	Save Operation
F8	Return to Previous Display
UP ARROW	MOVE TO PREVIOUS LINE
DOWN ARROW	MOVE TO NEXT LINE
RIGHT ARROW	MOVE TO NEXT FIELD
LEFT ARROW	MOVE TO PREVIOUS FIELD
PLUS KEY	DISPLAY NEXT OPTION
MINUS KEY	DISPLAY PREVIOUS OPTION

NOTE

This self-help menu may be displayed by pressing F10. Pressing F7 saves the new video display for use. Pressing RESET without pressing F7 will return the video display to the original (default) size (mode). The first number under the initial block of the configuration menu, (for example, 80) defines the line length, the second (for example, 16) the number of lines on the display. Selecting the number will change the Computer video display to the size and mode described on the list after pressing F7. Turning off or resetting the instrument will return the display to the selected mode.

g. The MODE utility program, which is used to set the video display mode, the two auxiliary port parameters (J6 and J7) or the line printer parameters, operates in the following manner.

1. To set the 80X25 and the 80X16 character mode:

A:MODE V:80X25 and then press [RETN],

or A:MODE V:80X16 and then press [RETN].

2. To set the 132X25 character mode:

A:MODE V:132X25 and then press [RETN].

3. To set the 40X16 and 40X25 graphics mode:

A:MODE i:4000 and then press [RETN]

and A:MODE V:40X16 and then press [RETN],

or A:MODE V:40X25 and then press [RETN].

h. Additional control operating sequences are listed in Section VIII.

SECTION IV
THEORY OF OPERATION

4-1. GENERAL.

4-2. When the DOT™ Computer is operating as a personal computer system, all computing functions are performed by the internal circuitry of the instrument. Operator interaction is accomplished through the Keyboard Assembly which takes and transfers the keystroke signals into the computer circuitry through a rear panel connection. These signals pass to the I/O Mother Board Assembly and to other assemblies of the computer for processing as shown in Figure 4-1.

4-3. The I/O Mother Board Assembly provides all peripheral interfaces and timers for the subassemblies and also provides the Z80 microprocessor and all timing for the serial communications ports and for a calender/clock on the DRAM/ROM Board Assembly. Each Disk Drive, which provides 287K bytes of storage giving a total of 547K bytes of information storage for the System when both drives are supplied is interfaced through a data separator on the I/O Mother Board Assembly.

4-4. The microprocessor clocks, the main processor (8088), and the bus controller are included on the DRAM/ROM Board Assembly along with ROMS for permanent program storage, CMOS RAM for nonvolitile data storage, and up to 256K of dynamic RAM for operator programs.

4-5. The CRT Controller Board generates all video for the System Video Display. This circuit board includes alpha-numeric and graphics capability and the horizontal and vertical sync timing as well as 32K of DRAM for bit mapped graphics. The CRT Controller Board also includes composite video circuitry for connecting to an external monitor.

4-6. The CRT Video Board Assembly connects to the Video Display and provides video and sweep signals to the Video Display.

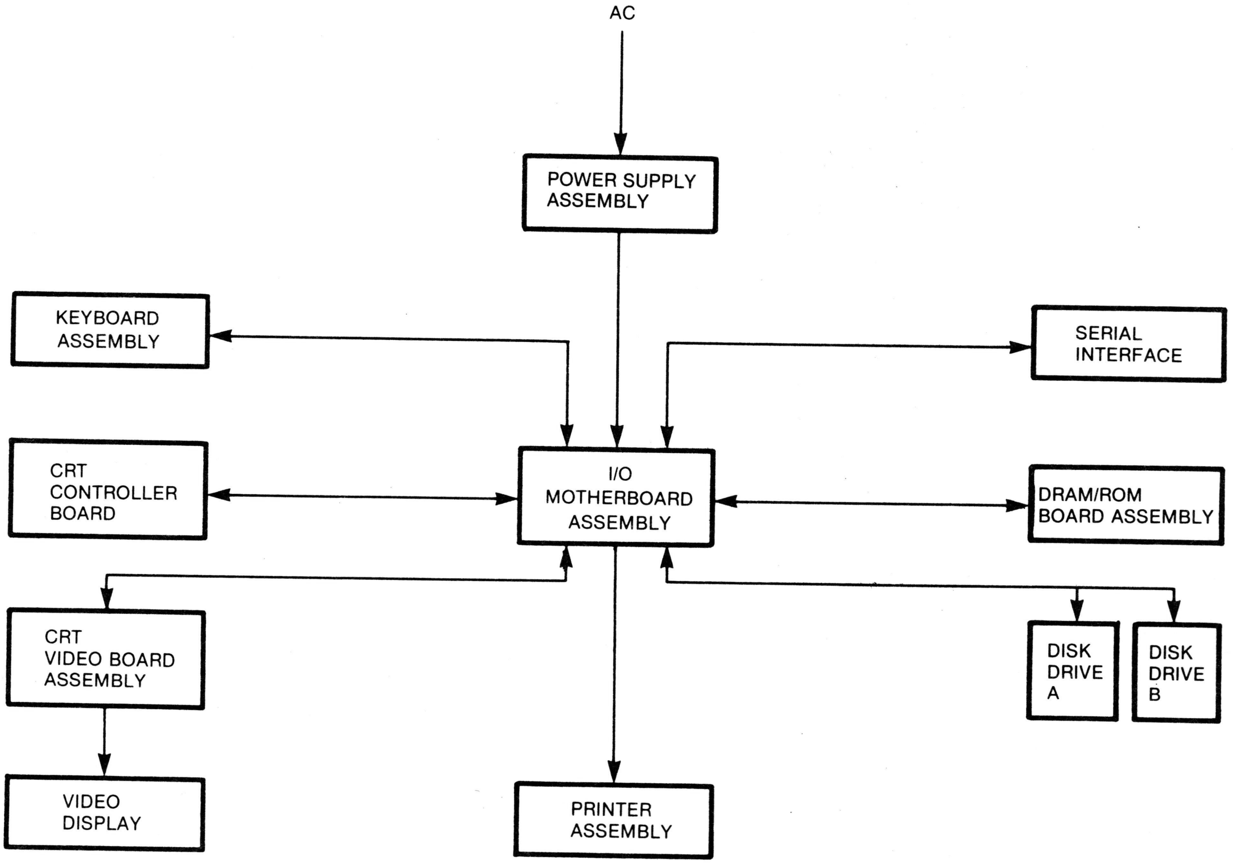
4-7. The Printer Assembly, when supplied, provides a hard copy printout for the System. This assembly is self-contained and all printing functions are provided for on the Printer Control Board secured to the mechanical printer frame. The Printer Assembly is capable of graphics printing and alpha-numeric printing in an 80 or 137 column format.

4-8. The Keyboard Assembly allows all inputs to the System to be made with a standard typewriter keyboard format and also includes ten soft function keys. In addition the Keyboard Assembly includes a separate numeric keypad and cursor control keys.

4-9. The Power Supply Assembly, a switching type power supply, provides all System voltages and includes overload and overvoltage protection circuits. The Power Supply Assembly also provides a power good signal to warn of impending power shutdown. This signal goes "low" 12 microseconds before +5 Volts drops out of tolerance when the System loses power.

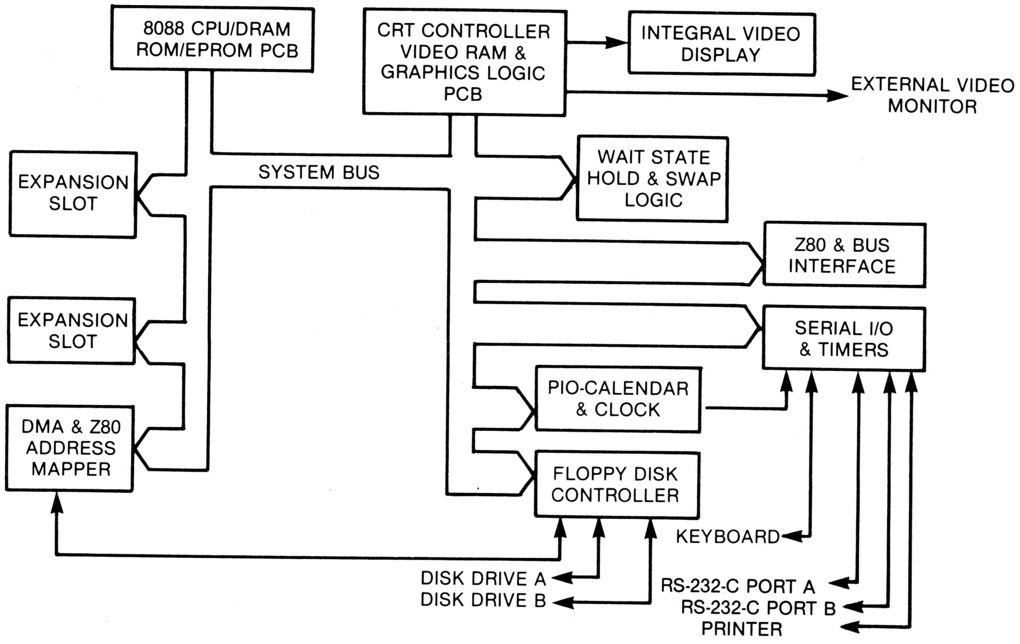
4-10. During modem operation (optional), telephone communication with a remote computer is established by transmitting data from the keyboard through the I/O Mother Board Assembly to the Printer Assembly if supplied and the Modem Assembly. From here the optional data is encoded (modulated) onto an analog single frequency audio signal and transmitted over the phone line to the modem at the remote computer system location (see Figure 4-2). The remote computer modem demodulates the input signals from the Terminal and sends them to the computer for processing as required. Communication from the remote computer is then returned in a similar manner back through the telephone lines into the Computer where the data is processed by the instrument and/or printed on the optional printer, if supplied, as outlined in paragraph 4-1.

4-11. A direct hardwire connection (Figure 4-3) (optional) through either of the RS-232-C ports results in a similar transfer of information, however the modulating/demodulating action outlined in paragraph 4-10 is not required and communication occurs as serial digitized information which is sent directly to a peripheral instrument or computer system. Information is returned to the Terminal in a similar manner and the data processing occurs in accordance with the processes outlined in the previous paragraphs.


AC
POWER SUPPLY ASSEMBLY
KEYBOARD ASSEMBLY
SERIAL INTERFACE
CRT CONTROLLER BOARD
I/O MOTHERBOARD ASSEMBLY
DRAM/ROM BOARD ASSEMBLY
CRT VIDEO BOARD ASSEMBLY
DISK DRIVE A
DISK DRIVE B
VIDEO DISPLAY
PRINTER ASSEMBLY

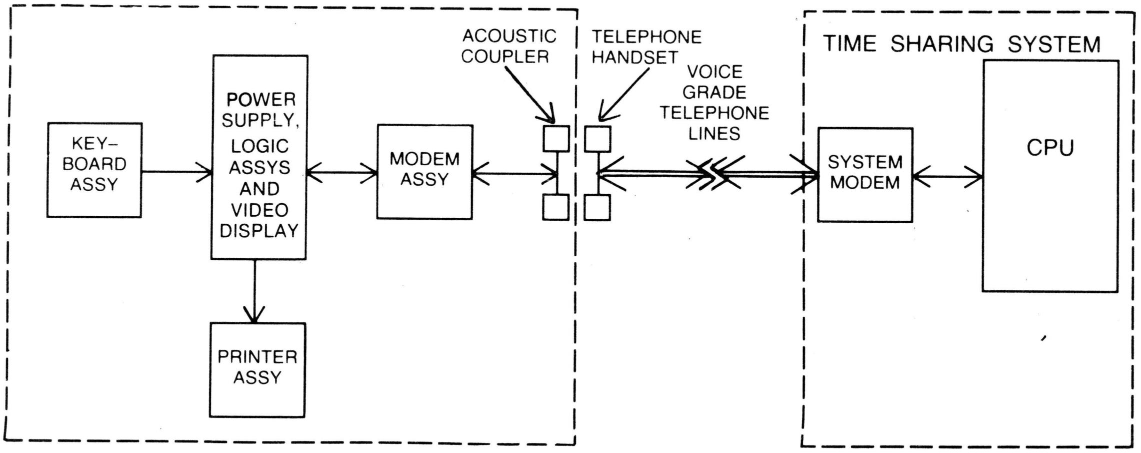
BLOCK DIAGRAM SHOWING SYSTEM ASSEMBLIES

Figure 4-1. Computer Block Diagram (Sheet 1 of 2).

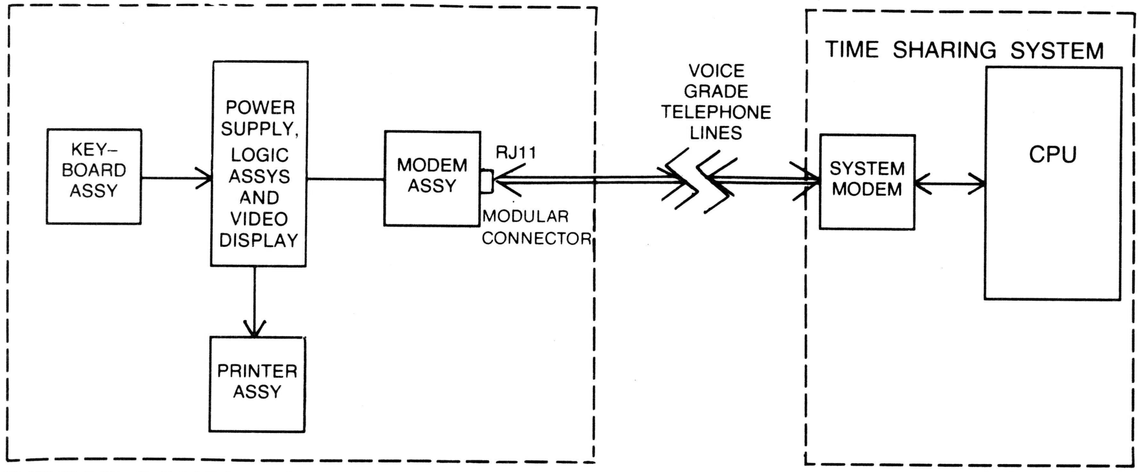

8088 CPU/DRAM ROM/EPROM PCB
CRT CONTROLLER VIDEO RAM & GRAPHICS LOGIC PCB
INTEGRAL VIDEO DISPLAY
EXTERNAL VIDEO MONITOR
EXPANSION SLOT
SYSTEM BUS
WAIT STATE HOLD & SWAP LOGIC
Z80 & BUS INTERFACE
EXPANSION SLOT
SERIAL I/O & TIMERS
PIO-CALENDAR & CLOCK
DMA & Z80 ADDRESS MAPPER
FLOPPY DISK CONTROLLER
KEYBOARD
DISK DRIVE A
DISK DRIVE B
RS-232-C PORT A
RS-232-C PORT B
PRINTER

BLOCK DIAGRAM SHOWING SYSTEM ARCHITECTURE

Figure 4-1. Computer Block Diagram (Sheet 2 of 2).

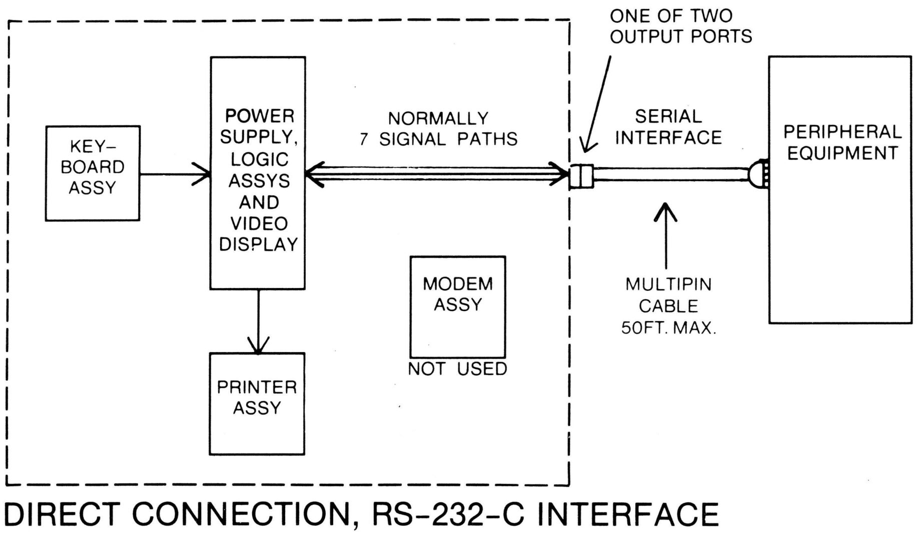

KEY-
BOARD
ASSY
POWER
SUPPLY,
LOGIC
ASSYS
AND
VIDEO
DISPLAY
MODEM
ASSY
PRINTER
ASSY
ACOUSTIC
COUPLER
TELEPHONE
HANDSET
VOICE
GRADE
TELEPHONE
LINES
TIME SHARING SYSTEM
SYSTEM
MODEM
CPU

ACOUSTIC COUPLING SYSTEM


KEY-
BOARD
ASSY
POWER
SUPPLY,
LOGIC
ASSYS
AND
VIDEO
DISPLAY
MODEM
ASSY
RJ11
MODULAR
CONNECTOR
PRINTER
ASSY
VOICE
GRADE
TELEPHONE
LINES
TIME SHARING SYSTEM
SYSTEM
MODEM
CPU

DIRECT COUPLING SYSTEM

Figure 4-2. System Communication Techniques, Modem Operation.


ONE OF TWO
OUTPUT PORTS
KEY-BOARD ASSY
POWER SUPPLY, LOGIC ASSYS AND VIDEO DISPLAY
NORMALLY
7 SIGNAL PATHS
SERIAL
INTERFACE
PERIPHERAL EQUIPMENT
MODEM ASSY
NOT USED
MULTIPIN
CABLE
50FT. MAX.
PRINTER ASSY
DIRECT CONNECTION, RS-232-C INTERFACE

Cable normally uses
7 of the 24 conductors

Figure 4-3. System Communication Techniques, Direct Connection.

4-12. GENERAL OPERATION.

4-13. Power Up Sequence.

4-14. There are two microprocessors available for use in the computer, an 8088 with 16-bit internal architecture and a Z80 with 8-bit internal architecture. When power is applied to the Computer, the 8088 processor on the DRAM/ROM Board Assembly is the selected processor. The 8088 processor begins execution at location FFFF0H in ROM and performs the hardware initialization and power up diagnostic routines. If a hardware malfunction is detected, the instrument will attempt to display the error condition on the Video Display and will wait for operator intervention. If no malfunction is detected, the 8088 processor will attempt to load the first sector of the diskette (in Drive A) into memory. If any diskette failure is detected (e.g. no drive, no diskette, or read failure) the Computer will default to the ROM based monitor. If a sector is successfully read into memory, the instrument will examine the first three bytes to insure that a valid 8088 bootstrap loader program was read. If the sector read is not the required routine, the 8088 will leave the track in memory (at Z80 address 0) and transfer control to the Z80 which starts at address 0 after reset.

4-15. 8088 Power Up Sequence.

4-16. If a valid 8088 bootstrap program was read, the ROM based loader transfers control to the program. Normally this is a MS-DOS bootstrap program which reads the hidden program files CDIIO.SYS and MSDOS.SYS into memory and transfers control to CDIIO.SYS. Programs CDIIIO.SYS and MSDOS.SYS will perform the operating system initialization, read the program on file COMMAND.COM into memory and transfer control to the memory.

4-17. The disk based program COMMAND.COM is the command interpreter module through which the operator comunicates with the MSDOS operating system. Once COMMAND.COM is executing the power up sequence is complete and further system operation is defined by MS-DOS and any user referenced application software programs.

4-18. If the sequence is not completed by successful loading of CDIIO.SYS, MS-DOS.SYS, or COMMAND.COM from the diskette in drive A, an error message will be displayed at the Video Display and the operator has to restart the system.

4-19. Z80 Power Up Sequence.

4-20. Prior to transferring control to the Z80 processor on the I/O Mother Board Assembly the 8088 processor has initialized the hardware, checked DRAM and successfully read in the first sector from the diskette in drive A. The Z80 processor begins execution at location 0. The memory contents should be the bootstrap loader which will load the Z80 operating system in a manner similar to that of 8088 operating system.

4-21. CDI Monitor.

4-22. If unable to bootstrap a disk based operating system on power up, the computer will enter a monitor program. The monitor will enter menu driven function select program.

4-23. On entry into the monitor program, the Video Display will show the system executable functions and wait for operator function selection.

4-24. Configuration Editor.

4-25. The ROM based Configuration Editor is entered via the monitor program and on entry will show the main menu. A help menu is available by pressing F10.

4-26. The operator moves the cursor to the desired option using the four cursor keys; a right arrow depression will move to the next rightmost field. At active line extremities, the cursor will move to the previous/next line as appropriate.

4-27. VT100 Emulator.

4-28. The computer will support a ROM based VT100 (basic) emulator mode, which is accessible via the ROM based monitor from an applications program. The VT100 emulator will:

1. Support VT100 and VT52 basic operational modes.
2. Closely emulate the VT100 setup mode.
3. Emulate the VT100 asynchronous communications interface.
4. Support the VT100 standard, auxiliary and cursor keypad key operations.

4-29. OPERATING THEORY FOR COMPUTER ASSEMBLIES.

4-30. The theory of operation for each of the Computer circuit boards or assemblies is given in the following paragraphs. The applicable schematic diagram and parts location diagram are referenced with each as an aid.

4-31. Keyboard Assembly (A2) (Figure 6-3).

4-32. The Keyboard Assembly (Figure 4-4) converts the operator keystrokes into a series of electrical pulses that represent each key as it is pressed or released. Circuitry on this assembly decodes the information and sends the resulting data to the I/O Mother Board/Rear Panel Assembly.

4-33. The Keyboard Assembly consists of an expanded typewriter-style keyboard and an electronic keyboard processor. Each key on the Keyboard is assigned an eight bit value. Pressing a key causes the assigned seven bit value to be transmitted to the System controller. Release of the key causes a value equal to 80H added to the assigned eight bit value, to be transmitted to the System controller.

4-34. The keycap legends and physical layout of the keyboard are shown in Figure 6-3. Five electrical connections are provided between the Keyboard Assembly and the I/O Mother Board Assembly: Ground, +5V, Send Data, Receive Data, and Reset.

4-35. The Keyboard Assembly communicates with the System controller with a full-duplex, 1200 baud, asynchronous start-stop serial channel. A data frame is eleven bits wide, consisting of one start bit, eight data bits, one even parity bit, and two stop bits. Electrical signaling on the serial channel is standard TTL logic levels, with a TTL low voltage indicating a space or a logical zero condition and a TTL high voltage indicating a mark or a logical one condition.

4-36. The Keyboard processor scans the keyboard at a rate sufficient for a 300 wpm burst typing speed and sends data to identify the depression (up-to-down transistion) of a particular key and the release (down-to-up transition) of a particular key. The Keyboard processor also maintains an eight-byte buffer for the storage of data awaiting transmission to the System.

4-37. Following the transmission of a byte of data by the Keyboard processor to the System controller, the Keyboard processor waits for the receipt of the ready data byte from the System controller before allowing another data byte to be transmitted If the eight-byte buffer overflows, then an overflow data byte overwrites the last byte that was stored in the communication buffer. The Keyboard processor upon receiving Clear Buffer command from the System Controller, clears the internal eight-byte communication buffer and sends a Buffer Cleared status message.

4-38. Special status messages which may be sent by the keyboard are coded as follows:

OFFH - Overflow: The eight-byte Keyboard processor data buffer has overflowed.
OFEH - Buffer Cleared: The eight-byte Keyboard processor data buffer has been cleared as requested.
OFDH - Self-Test Good: The self-test requested diagnostic indicates that the Keyboard Assembly is fully operational.
OFCH - Self-Test Processor Failure: The requested self-test diagnostic indicates that the Keyboard processor is defective.
OFBH - Self-Test Key Stuck: The self-test diagnostic indicates that a key is in a pressed (down) condition.
OFIH - Product ID: The product ID number assigned to the Keyboard Assembly.

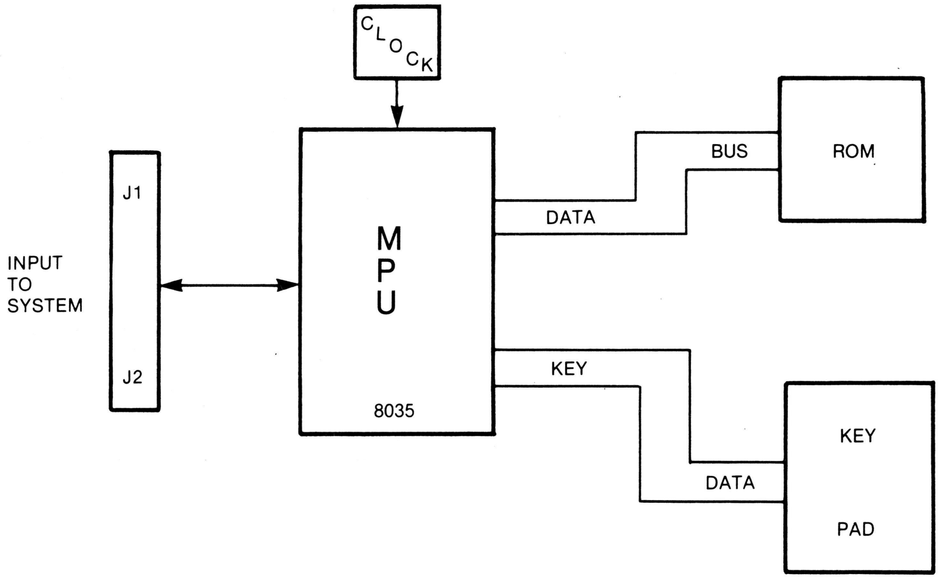

CLOCK
BUS
ROM
J1
DATA
M
P
U
INPUT
TO
SYSTEM
J2
KEY
8035
KEY
DATA
PAD

Figure 4-4. Keyboard Assembly (A2) Simplified Block Diagram.

4-39. The following commands are received by the Keyboard Assembly from the system controller:

01H -	Self-Test: Do a self-test of the Keyboard Assembly
02H -	Clear Buffer: Clear the eight-byte Keyboard processor of all stored data.
03H -	Ready: The system controller has processed the previous data byte and is ready to receive a new data byte.
04H -	Send Product ID: Send the product ID code for the Keyboard Assembly.

4-40. The Keyboard processor, upon receiving a self-test command from the system controller, undergos an internal processor self-test (ROM checksum), verifys that all keys on the Keyboard are released, clear the internal eight-byte data buffer, and transmits the appropriate status message.

4-41. If the self-test diagnostic indicates that the Keyboard Assembly is fully operational, then a self-test good status message is transmitted. If the internal processor self-test fails, then a self-test processor failure status message is transmitted. If the internal processor self-test succeeds, but a key is detected in a down state, then key codes for the pressed keys are transmitted, followed by the self-test key stuck status message.

4-42. The Keyboard Assembly contains circuitry to perform internal "power on" reset, Additionally the Keyboard Assembly will be reset on receipt of a reset signal logic level "0". The CAPS LOCK Key contains an integral LED. Code transmission protocol, however, is identical to the other keys, independent of the state of the LED but does not send a key-up code. The CAPS LOCK light is controlled with the following commands from the system controller:

05H -	Light On
06H -	Light blink (approximately 0.75 second on, 0.25 second off)
07H -	Light Off

4-43. Front Panel Assembly (A4) (Figure 6-4).

4-44. The Front Panel Assembly includes the Disk Drive mounting enclosure, the Video Display Tube and the Floppy Fan and Speaker Assembly. Power and signal interconnections are shown in Figure 4-5.

4-45. DRAM/ROM Board Assembly (A5) (Figure 6-5).

4-46. The DRAM/ROM Board Assembly (Figure 4-6) is the primary logical and control element for the Computer system. The assembly contains the program storage ROMs, the dynamic RAMs for working storage, the configuration RAM for terminal configuration, the CPU, the optional numeric data processor, the clock generator, the system bus controller, data and address latches, bi-directional data bus drivers, and drivers and latches required for the address and control lines.

4-47. The assembly contains the main system processor, an optional numeric data processor and the bus control circuitry which performs all the control functions for the main system processor. The assembly also contains the multiprocessor clock generator, which reduces the crystal frequency of 14.7456MHz to about 4.9152MHz for the main system processor, and 2K X 8 of RAM with battery back-up, 32K of ROM space and upto 256K X 8 of dynamic RAM.

4-48. The ROM space contains the processor program, the RAM (static RAM) contains configuration information, and the dynamic RAM is used for program memory space. The dynamic RAM, arranged in four banks of 64K X 9 per bank with the ninth RAM in each bank being a parity RAM, is used to check for errors in data being read from RAM. The RAM chips have 16 address lines which are multiplexed onto eight address pins. The address demultiplexing is controlled by RAS0 to RAS3 and CAS0 to CAS3. RAS0 refers to Row Address Select for RAM 1 and CAS0 refers to column address select for RAM 1 and so on for each RAM. RAS selects the low order addresses or A0 - A7 and CAS selects the high order address or A8 - A15. The low 16 address lines from the processor are multiplexed down to eight lines for the RAM through two multiplexer chips (Z50 and Z58). The low order addresses are enabled through the multiplexers when the RAS lines are selected and high order addresses are enabled through the multiplexers when the CAS lines are selected. The RAS enable is always followed immediately by CAS enable with CAS being delayed a small amount of time by delay module DM-100 (Z39). Address lines A15 and A16 are used as band select lines and are decoded or demultiplexed from two lines to four lines to become the control lines RAS0 to RAS3 and CAS0 to CAS3. These lines are also used as "refresh" controls to the dynamic RAM which must be periodically refreshed to retain the data. All address and data lines connected to the system bus are interfaced through buffers. The 8088 multiplexes the address and data on the same pins. The address information is separated by the latches (74LS373). Both address data lines are then buffered (74LS245 for data, 74LS244 for address).

4-49. The DRAM/ROM Board Assembly includes the following.

- The 8088 Central Processing Unit.
- An 8284 Clock Generator.
- An 8087 Numeric Data Processor (Optional).
- An 8288 System Bus Controller.
- Provisions for seven 2764 EPROMS or ROMS (Optional 2732 EPROMS).
- Provisions for up to four banks of 64K of dynamic RAM, for a total of 256K bytes of on-board DRAM.
- 2K bytes of Static RAM for Computer configuration control (battery backed).
- A parity checker DRAM.

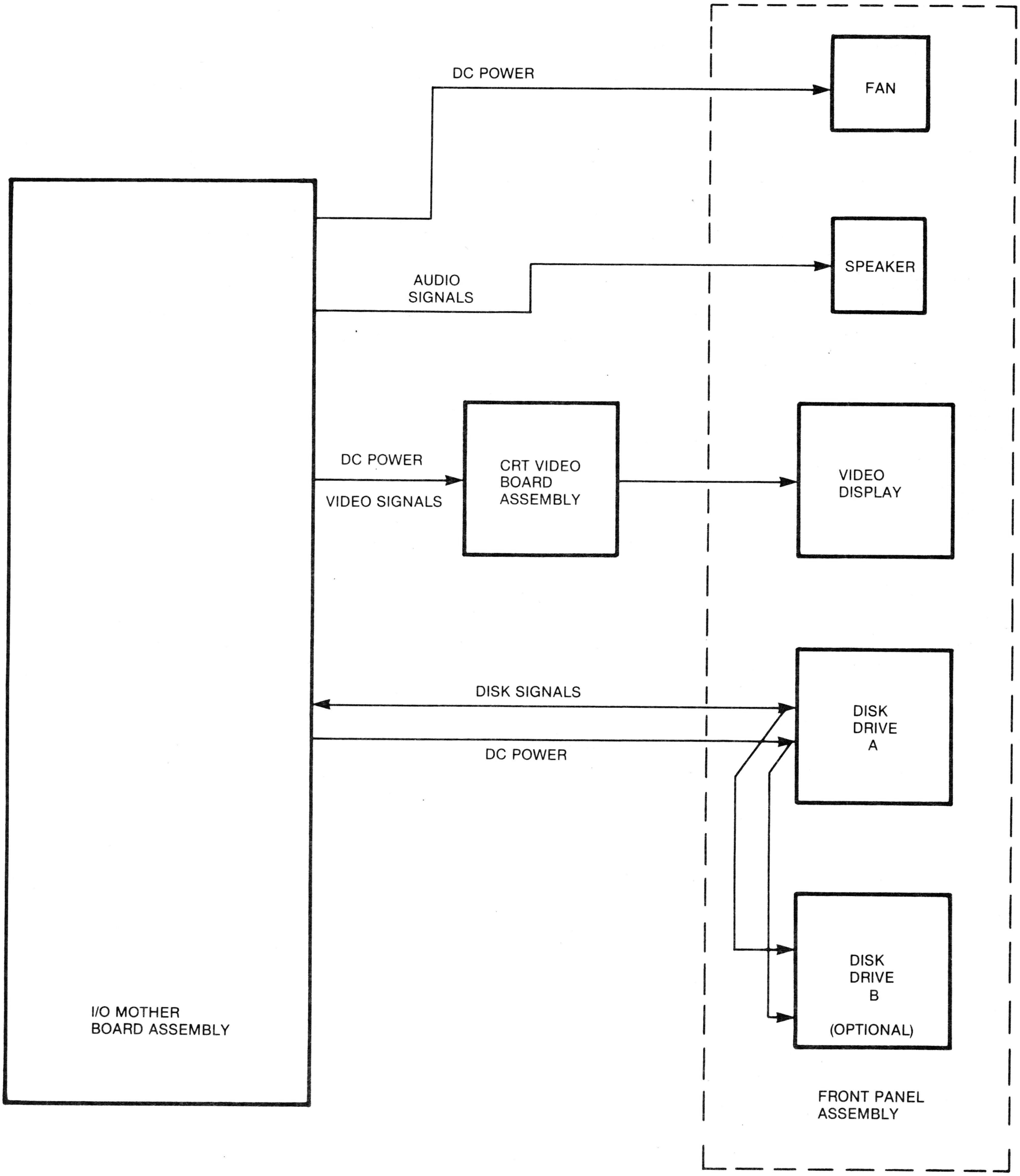

DC POWER
FAN
AUDIO SIGNALS
SPEAKER
DC POWER
VIDEO SIGNALS
CRT VIDEO BOARD ASSEMBLY
VIDEO DISPLAY
DISK SIGNALS
DC POWER
DISK DRIVE A
DISK DRIVE B
(OPTIONAL)
I/O MOTHER BOARD ASSEMBLY
FRONT PANEL ASSEMBLY

Figure 4-5. Front Panel Assembly (A4) Block Diagram.

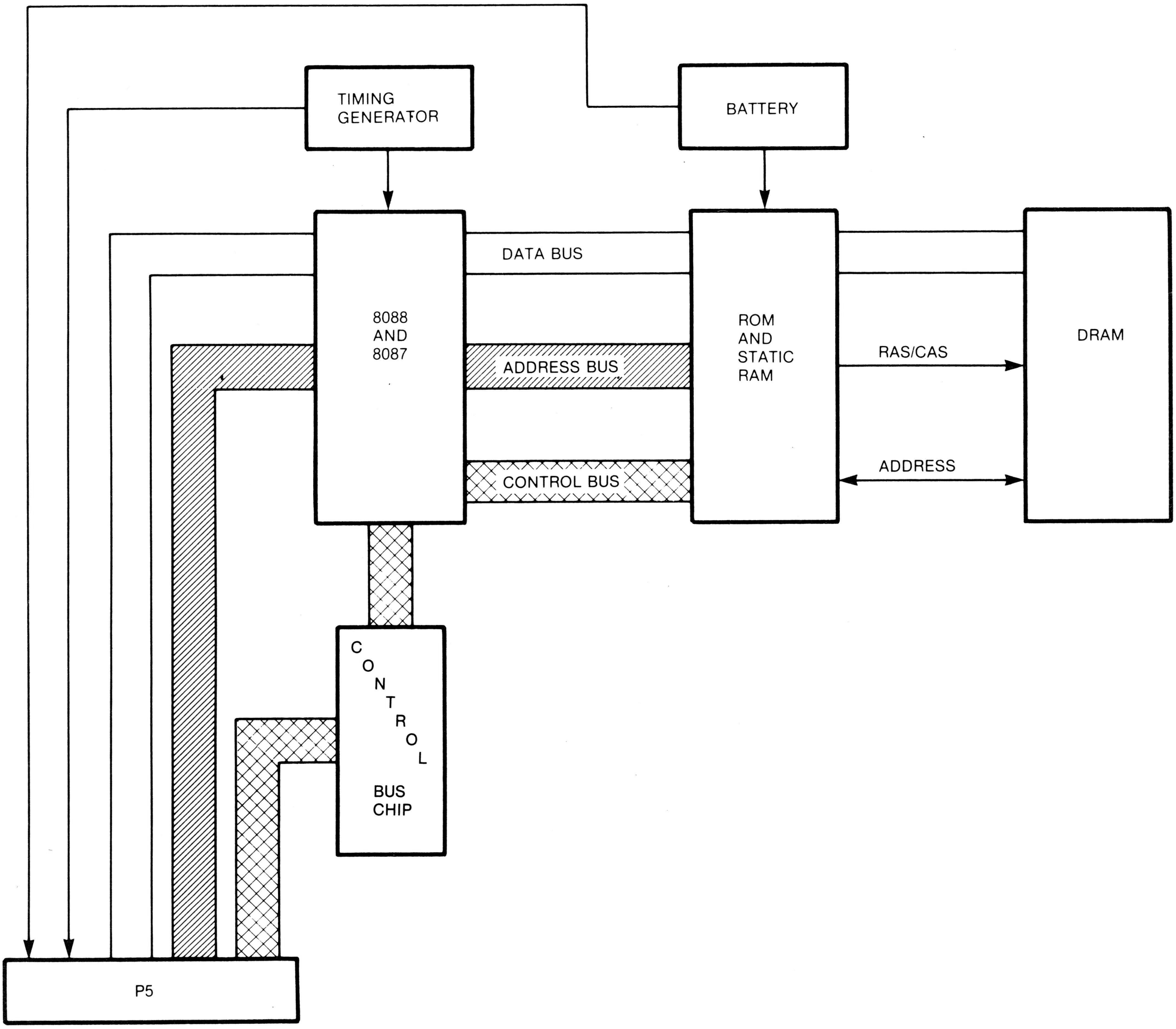

TIMING GENERATOR
BATTERY
8088 AND 8087
DATA BUS
ADDRESS BUS
CONTROL BUS
ROM AND STATIC RAM
RAS/CAS
ADDRESS
DRAM
CONTROL BUS CHIP
P5

Figure 4-6. DRAM/ROM Board Assembly (A5) Simplified Block Diagram.

- Address latches.
- Bus drivers required for data, address, and control lines.

4-50. The 8088 is the primary processor for the system and has a 16-bit internal architecture which provides for 16-bit registers and internal data paths, 16-bit ALU, and a 16-bit instruction set. The external data path is eight bits wide. This CPU also features a 20-bit address range and a 16-bit I/O port address range. This gives the 8088 more than one megabyte of memory address space and 64K bytes of I/O port address space.

4-51. CRT Controller Board Assembly (A6) (Figure 6-6).

4-52. The CRT Controller Board Assembly (Figure 4-7) provides black and white alpha-numeric and graphics capability to the computer. This assembly drives the integral five by nine inch Video Display and will drive an external monitor. The CRT Controller Assembly provides all logic required by the Computer to produce graphics and generate all characters on the Video Display. The main clock is provided by crystal (Y2) and clock chip U68. The clock is then divided down by U56 and U57 and provides the RAS (Row Address Select) and CAS (Column Address Select) control lines for the RAM memory as well as the clock for the Video Display controller (U29) and also provides clocks for graphics generation and character generation.

4-53. The Video Display controller (U29) provides vertical and horizontal syncronization to the Video Display through D-flip-flop U34 as well as control addresses to the character ROM U27 and also addresses the Video Display RAM memory through octal D-flip-flops (U19, U20).

4-54. The CRT Controller Assembly Board is addressed by the System through octal D-flip-flops (U17, U18) and all the information addressed to the board assembly is read into the RAM memory. The RAM memory consists of two banks of eight 16K RAM chips per bank. RAM information is then processed through D-flip-flops U30 and U21 to register U26 for graphics information and to the character ROM U27 for character generation and then to register U32. The information, whether it is graphics or characters, is then processed through hex D-flip-flop U36 and control logic to hex buffer U51. The data is then sent to the Video Display or, if desired, to an external video monitor. All the data lines from the system and from the CRT board to the system are processed through bi-directional buffer U74 and transparent latch U73 to the Video Display controller chip U29. Data lines from the RAM are processed through octal D-flip-flops U22, U23, and U24. Control address lines from the System to the Video Display are demultiplexed (or decoded) through demultiplexers U44 and U66 and control the character size through D-flip-flop U50. The character attributes or character blink is controlled through demultiplexers U25, U33, and U37 to D-flip-flop U35.

4-55. The CRT Controller Assembly is a 6845 video display controller that plugs into an I/O slot on the I/O Mother Board. On board memory capability is 128K. Both 80 column and 132 column formats are supported with both character graphic and bit mapped addressable graphic modes. There are 25 lines in character graphics mode. The CRT Controller Board Assembly includes the following:

- The 6845 which provides memory addressing, horizontal and vertical sync timing, display blanking and cursor generation and location.
- Two banks of 8 X 16K dynamic RAMs which provide 1056 dots X 248 dots of bit mapped graphics, or any lesser resolution for character or bit mapped graphics.
- Timing logic to supply the proper clocks for read/write synchronization, 6845 clock, RAM refresh, latch multiplexing, and video dot timing.
- Control logic for format and mode selection, address decoding, latch and status control, and video buffer enable.
- Attribute logic which is operational when in the character graphics mode. This allows for intensity modulation of data on a character basis. Blinking, blanking, overscore, underscore, and reverse video are available.
- An 8K character generator PROM to provide two 256 character graphic sets. Characters are formed in an 8 X 10 cell.

4-56. CONTROL LOGIC. There are two addressable mode/format control registers and a status buffer.

4-57. VIDEO RAM. The video RAM is mapped to 8088 addresses B0000 to B7FFF(Hex). When in the 80 column format, writes to video RAM may be performed at any time without adding CPU wait states. Reads will cause an occasional wait state depending on the state of the request arbiter when the read request occurs. While operating in the 132 column format, reads and writes to video RAM occur during the retrace intervals to prevent screen tear. Alternately, the screen is blanked during a RAM access. Characters and attributes are stored in byte pairs. The even byte of a pair contains address information for the character generator. The odd byte of a pair contains attribute information.

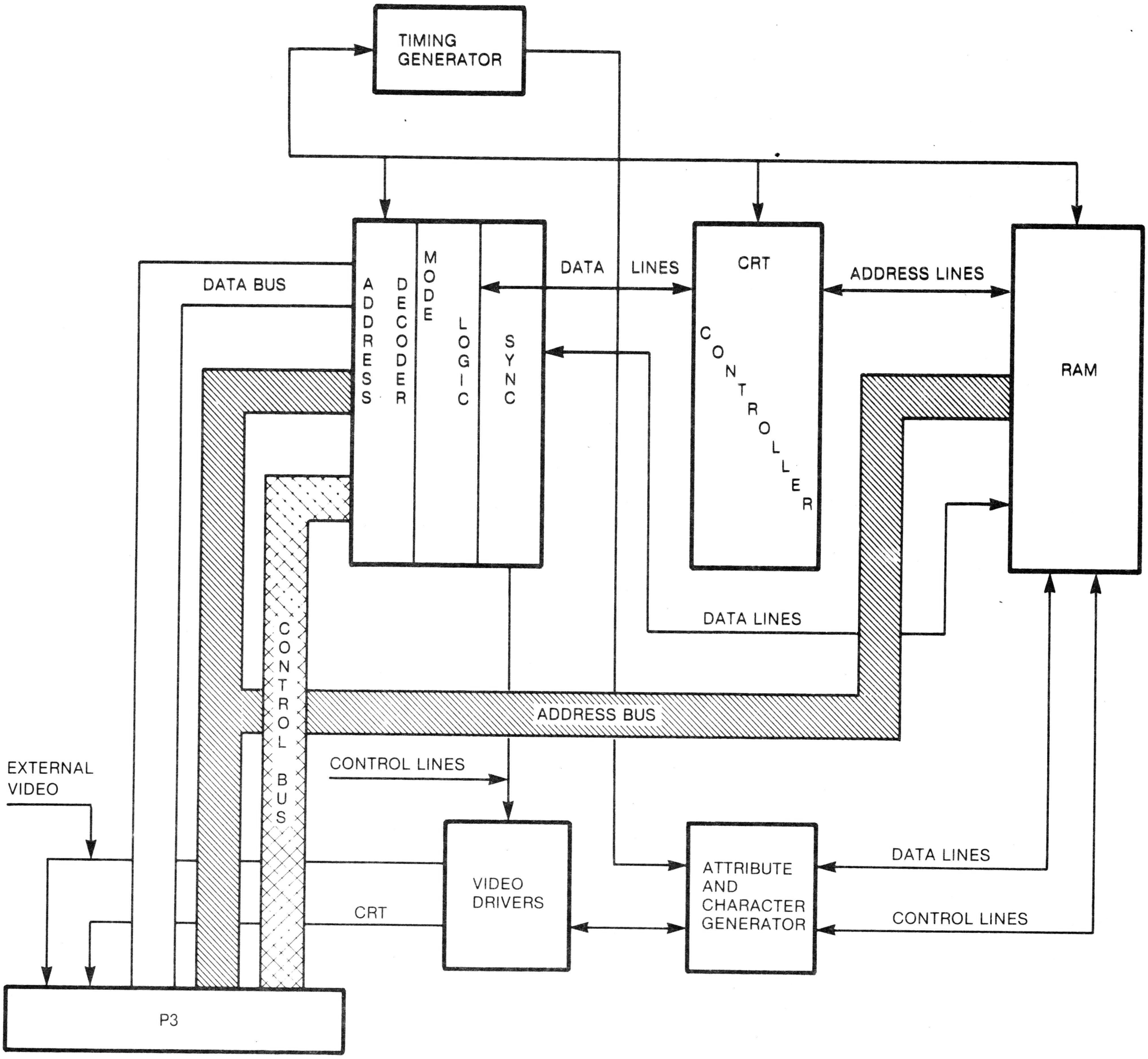

TIMING GENERATOR
DATA BUS
ADDRESS DECODER
MODE LOGIC
SYNC
DATA LINES
CRT CONTROLLER
ADDRESS LINES
RAM
DATA LINES
CONTROL BUS
ADDRESS BUS
EXTERNAL VIDEO
CONTROL LINES
VIDEO DRIVERS
ATTRIBUTE AND CHARACTER GENERATOR
DATA LINES
CRT
CONTROL LINES
P3

Figure 4-7. CRT Controller Board Assembly (A6) Simplified Block Diagram.

4-58. Printer Assembly (A7) (Optional) (Figure 6-7).

4-59. The Printer Assembly includes two subassemblies, the Printer Control Board (A7A1) which contains control circuitry (see next paragraph) and the Plotting Printer Assembly (A7A2) which provides the electro-mechanical means for printing computer data.

4-60. PRINTER CONTROL BOARD (A7A1). The Printer Control Board (Figure 4-8) contains all the logic and circuitry required to generate the signals required for bidirectional alpha-numeric or graphic operation. The circuit board provides those signals required for carriage and line feed operation, generates the printhead dot strobe, and provides the dot data to the thermal devices in the printhead. The following LSI chips are used: an 8155 (a 256 byte RAM with I/O ports and timer/counter) an 8031 single chip microprocessor, two 2764 EPROMS (8K X 8), and a Static RAM (either a 2K X 8 or an 8K X 8). All communication between the printer board and the host processor is through the serial communication lines RxD and TxD (pins 2 and 4 of J2). The 8031 controls all printer operation, including carriage movement, printing, and serial communications with the host. The serial data link is provided through the 8251A located on the I/O Mother Board Assembly and the integral serial channel of the 8031 on the Printer Control Board. During operation the transmission rate is 1200 Baud. The protocol is eight bit data with one start bit, two stop bits, and even parity. The RTS line from the 8251A on the host transmitted data is used to multiplex to either the Printer Assembly or the Keyboard Assembly. For transmission to the Printer Assembly, RTS in the 8251 must be set to zero (RTS = 1 externally).

4-61. PLOTTING PRINTER ASSEMBLY (A7A2). The Plotting Printer Assembly is an electro-mechanical thermal printer assembly that receives control signals from the Printer Control Board.

4-62. Fan/AC Bracket Assembly (A9A1) (Figure 6-11).

4-63. This assembly provides the primary power input circuitry and includes an integral circuit breaker/ac power switch and one of the cooling fans. An ac line filter and the power input connector are also included on this assembly.

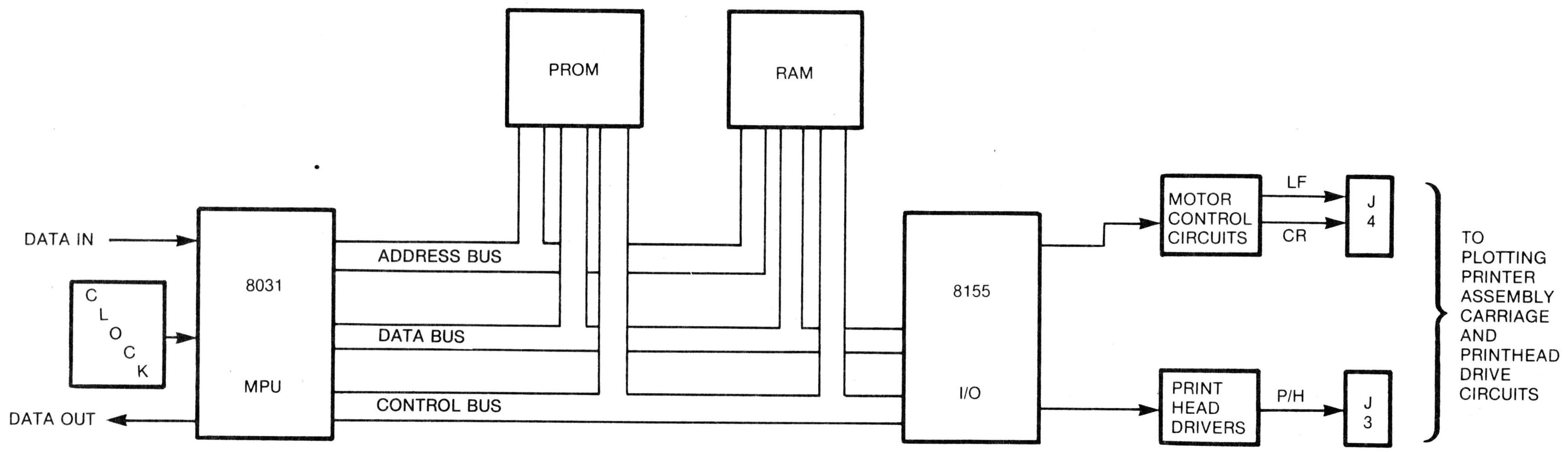

PROM
RAM
DATA IN
CLOCK
DATA OUT
8031
MPU
ADDRESS BUS
DATA BUS
CONTROL BUS
8155
I/O
MOTOR CONTROL CIRCUITS
PRINT HEAD DRIVERS
LF
CR
P/H
J 4
J 3
TO PLOTTING PRINTER ASSEMBLY CARRIAGE AND PRINTHEAD DRIVE CIRCUITS

Figure 4-8. Printer Control Board (A7A1) Block Diagram.

4-64. Power Supply Assembly (Figure 6-10).

4-65. This assembly (Figure 4-9) includes circuit boards connected together and covered with a metal cover which acts as a heat sink. The supply is an off-line, switching-mode supply which directly rectifies the ac line, without an intervening transformer. This supply is a "universal" type, which operates with either 120 Volt or 240 Volt AC line voltage inputs, determined by a switch setting. The output of the 60-Hz rectifier and filter is a dc voltage proportional to the input voltage.

NOTE

> Switching-mode Power supplies provide a smaller, lighter design than a linear type because the power transformer(s) operate at a much higher frequency (25 Khz vs. 60 Hz). The disadvantage of a switching-type supply is increased circuit complexity and noise potential.

4-66. This single, unregulated voltage is converted to multiple outputs through the 25-KHz switching power converter. The converter will operate at full load with mains voltages in the range of 93-128 Volts (RMS) or 186-256 Volts (RMS). The converter also provides safety isolation from the potentially hazardous mains voltage. During operation with the pulse-width modulation controller, the switching converter provides one regulated output (+5 Volts dc) and four semi-regulated outputs (+4.5, +17, +16, and -16 Volts). Additional regulation for the multiple outputs is done by linear regualtors at the outputs of the switching converter which results in four fully regulated outputs (+5, +13.5, +12, and -12 Volts), and two loosely regulated outputs (+4.5 and +17 Volts). The important characteristics of the outputs are given in the following table.

POWER SUPPLY OUTPUT CHARACTERISTICS.

NOMINAL OUTPUT VOLTAGE	AVERAGE CURRENT CAPABILITY	OUTPUT POWER	REGULATION(%): LINE: 93-128 (186-256V) LOAD: 20-100%	RIPPLE AND NOISE (mVp-p in 1 MHz)
+4.5	1.0	4.5	±10	350
+5	7.5	37.5	±5	50
+12	2.7	32.4	±1*	10
-12	0.25	3.0	±5	100
+13.5	1.6	21.6	±1	100
+17.0	0.05	0.85	±30	---
TOTAL OUTPUT POWER		100.0W		

* LOAD RANGE = 52% TO 100% AVERAGE CAPABILITY

Table 4-1. Power Supply Output Characteristics.

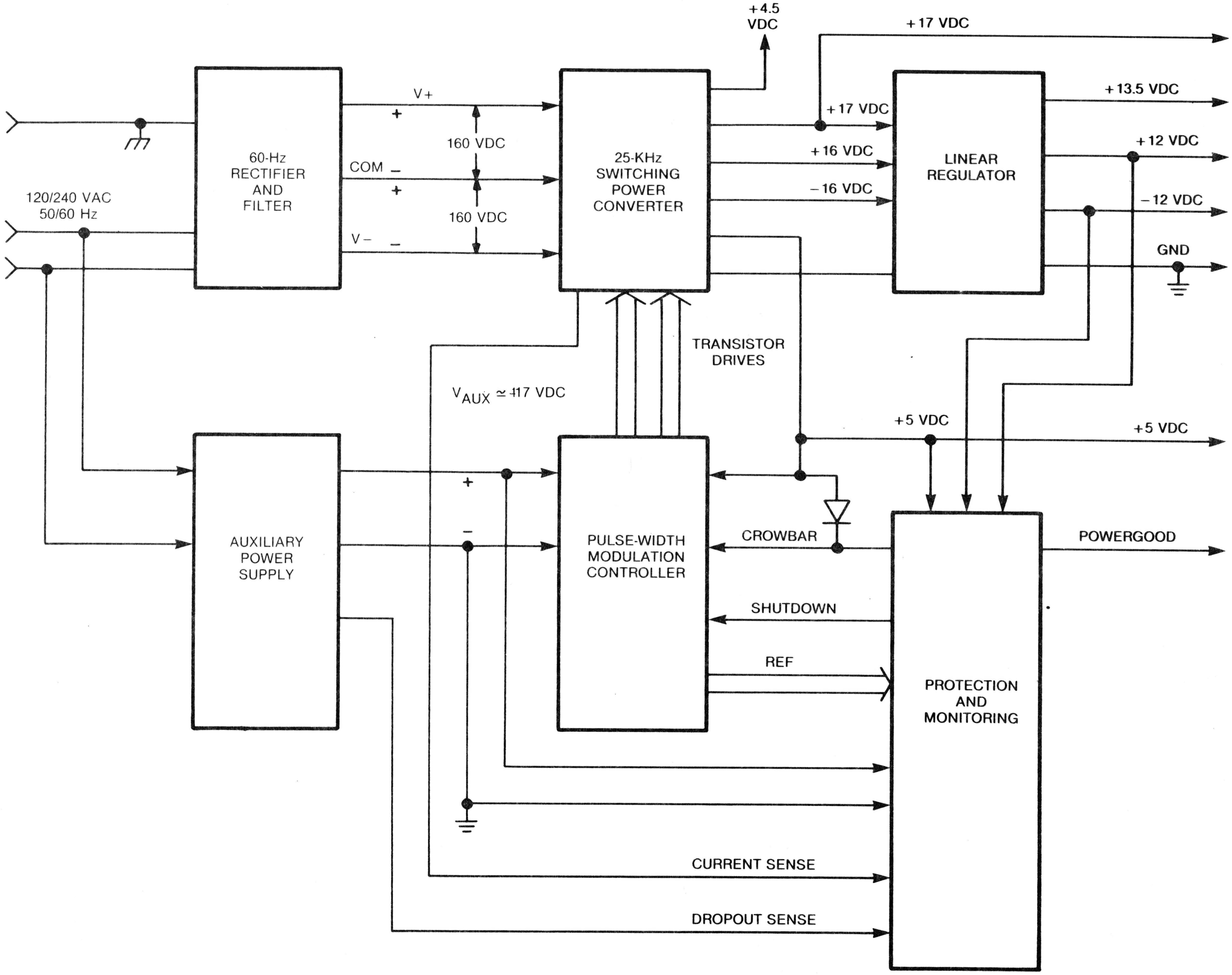

120/240 VAC
50/60 Hz
60-Hz RECTIFIER AND FILTER
V+
+
COM –
+
V–
–
160 VDC
160 VDC
25-KHz SWITCHING POWER CONVERTER
+4.5 VDC
+17 VDC
+17 VDC
+16 VDC
–16 VDC
LINEAR REGULATOR
+13.5 VDC
+12 VDC
–12 VDC
GND
TRANSISTOR DRIVES
$V_{AUX} \simeq 17$ VDC
AUXILIARY POWER SUPPLY
+
–
PULSE-WIDTH MODULATION CONTROLLER
+5 VDC
+5 VDC
CROWBAR
SHUTDOWN
REF
PROTECTION AND MONITORING
POWERGOOD
CURRENT SENSE
DROPOUT SENSE

Figure 4-9. Power Supply Assembly (A8) Simplified Block Diagram.

4-67. Special circuitry is included to protect the supply against damage from excessive current draw (as would occur during an output short-circuit) and to protect the logic connected to the supply against excessive voltage on the +5 Volt output (crowbar). Additional circuitry provides a flag to the logic to indicate when the +12, -12, or +5 Volt supplies are out of tolerance, and to warn of impending shutdown of the supply due to AC line dropouts or brownouts.

4-68. The protection, monitoring, and control circuits are powered by a separate, low-power linear-type supply (auxiliary power supply in Figure 4-9). In addition to providing mains-isolated dc power, the auxiliary power supply generates a full-wave-rectified, unfiltered replica of the ac mains voltage for the monitor circuits.

4-69. I/O Mother Board Assembly (A9A2A1) (Figure 6-12).

4-70. The I/O Mother Board Assembly (Figure 4-10) includes a microprocessor control and signal base for the Computer circuit boards and provides the system I/O and bus interface slots. All interface connections for respective I/O functions are hardwired to this system circuit board. All signal line levels are at TTL levels. All output signal levels are TTL.

4-71. FUNCTIONAL DESCRIPTION. The 8274 Multi-Protocol Serial Controller MPSC), implements two independent serial receiver/transmitter channels. The MPSC supports Polled, Wait and Interrupt Driven interface options as software options: The 8255A Programmable Peripheral Interface device is a general purpose I/O component for interfacing peripherals to the system bus. Software utilizes any of the three basic modes of operation which are a follows:

- o Mode 0 ---- Basic Input/Output
- o Mode 1 ---- Strobed Input/Output
- o Mode 2 ---- Bi-Directional Bus

4-72. The 8253 is a Programmable Interval Timer/Counter. There are two 8253's on the motherboard. One is used for the tone generator and tic-timer. The other is used for baud rate generation. The 8237 Multi-Mode Direct Memory Access (DMA) controller is peripheral device interface circuit. This controller permits external devices to transfer information directly to or from system memory. Two basic transfer modes are provided for DMA service for the user. Each channel can be individually programmed to Auto-Initialize (reset) to initial conditions following an End of Process (EOP). The two active modes of transfers are Read and Write. An 8251A USART provides asynchronous communications to the Printer Assembly and the Keyboard Assembly. The uPD 765 is the Floppy Disk Controller which supports two floppy disk drives (Drive A and Drive B) in a double density format (MFM). Handshaking signals are provided for DMA operation with the DMA controller 8237. The Controller will operate in either DMA or non-DMA mode, software selectable. The Controller provides the following capabilities:

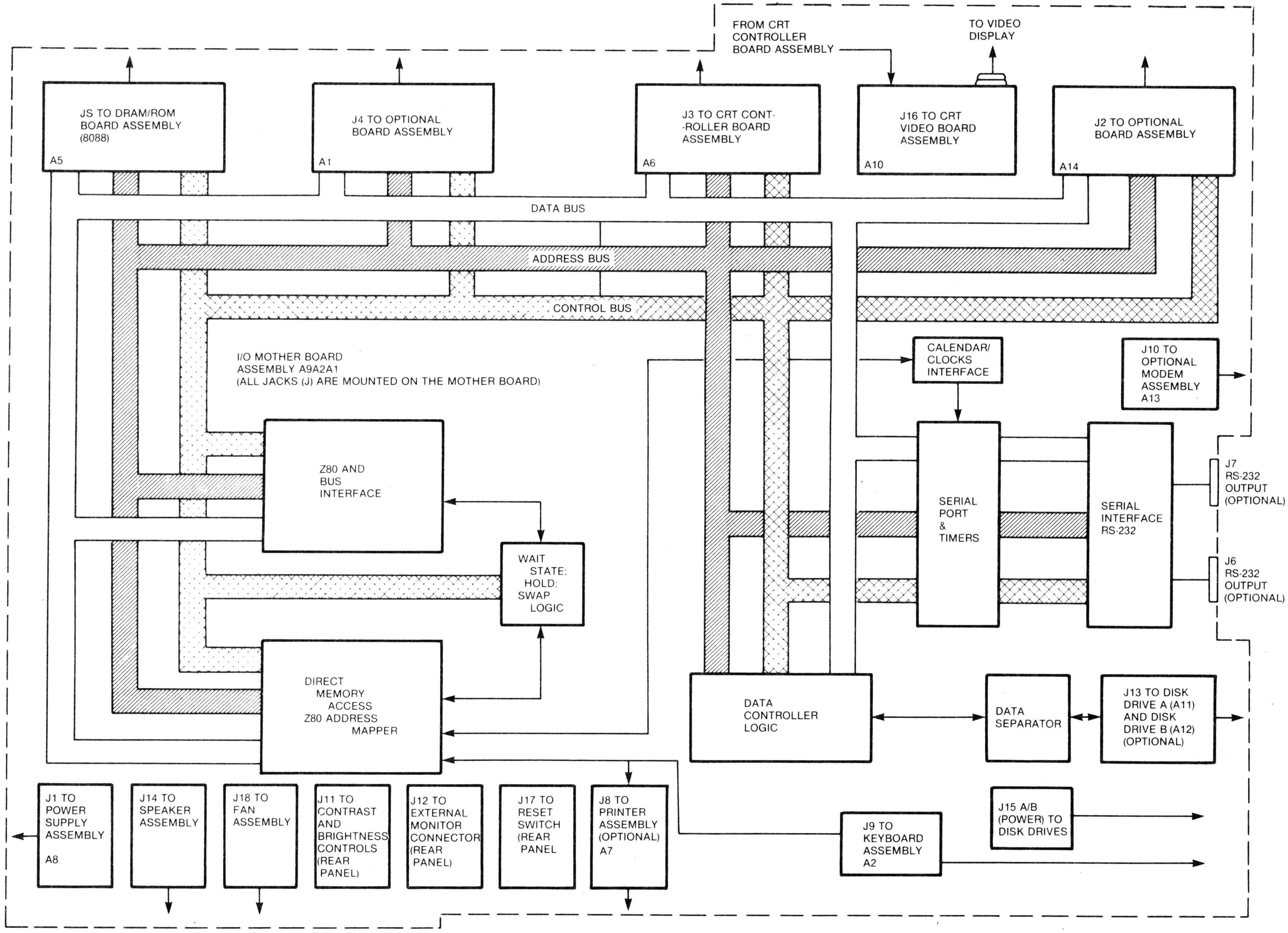

FROM CRT
CONTROLLER
BOARD ASSEMBLY
TO VIDEO
DISPLAY
JS TO DRAM/ROM
BOARD ASSEMBLY
(8088)
A5
J4 TO OPTIONAL
BOARD ASSEMBLY
A1
J3 TO CRT CONT-
-ROLLER BOARD
ASSEMBLY
A6
J16 TO CRT
VIDEO BOARD
ASSEMBLY
A10
J2 TO OPTIONAL
BOARD ASSEMBLY
A14
DATA BUS
ADDRESS BUS
CONTROL BUS
I/O MOTHER BOARD
ASSEMBLY A9A2A1
(ALL JACKS (J) ARE MOUNTED ON THE MOTHER BOARD)
CALENDAR/
CLOCKS
INTERFACE
J10 TO
OPTIONAL
MODEM
ASSEMBLY
A13
Z80 AND
BUS
INTERFACE
SERIAL
PORT
&
TIMERS
SERIAL
INTERFACE
RS-232
J7
RS-232
OUTPUT
(OPTIONAL)
J6
RS-232
OUTPUT
(OPTIONAL)
WAIT
STATE:
HOLD:
SWAP
LOGIC
DIRECT
MEMORY
ACCESS
Z80 ADDRESS
MAPPER
DATA
CONTROLLER
LOGIC
DATA
SEPARATOR
J13 TO DISK
DRIVE A (A11)
AND DISK
DRIVE B (A12)
(OPTIONAL)
J1 TO
POWER
SUPPLY
ASSEMBLY
A8
J14 TO
SPEAKER
ASSEMBLY
J18 TO
FAN
ASSEMBLY
J11 TO
CONTRAST
AND
BRIGHTNESS
CONTROLS
(REAR
PANEL)
J12 TO
EXTERNAL
MONITOR
CONNECTOR
(REAR
PANEL)
J17 TO
RESET
SWITCH
(REAR
PANEL
J8 TO
PRINTER
ASSEMBLY
(OPTIONAL)
A7
J9 TO
KEYBOARD
ASSEMBLY
A2
J15 A/B
(POWER) TO
DISK DRIVES

Figure 4-10. I/O Mother Board Assembly (A9A2A1) Simplified Block Diagram.

- Multi-Sector and Multi-Track Transfers.
- Data Scanning.
- Data Transfers in DMA or Non-DMA Modes.
- Parallel Seek Operation.

4-73. The 8259 is a Programmable Interrupt Controller which can handle up to eight vectored interrupts. The generated vector selects the I/O device channel requesting service. The 74LS670 is a Dual Port Register File organized as four words of four bits each. Separate read, write address and enable inputs are available, which permit simultaneous writing into one word location and reading from another location. The four-bit word to be stored is presented to four DATA inputs. The write address inputs determine the location of the stored word. Direct acquisition of data stored in any of the four registers is made possible by individual read address inputs. The Z80B CPU instruction set has 158 instructions. The Z80B runs at the same clock rate as the 8088 CPU on the DRAM/ROM Board Assembly. The Z80B allows the use of the CPM 2.2 operating system. The MM5874 is a calendar/clock chip that is battery backed up to provide real time calendar/clock functions and is accessed by several lines of the Peripheral Interface Circuit Chip (8255A).

4-74. OPERATION. The I/O Motherboard Assembly bus provides an eight-bit bi-directional bus, 20 address lines, four levels of interrupts, control lines for memory and I/O reads and writes, clock and timing lines, three channels of DMA control lines, memory refresh timing control lines, as well as power and return ground lines. Three voltage levels are provided to the Motherboard. The voltages supplied are +5, +12 and -12 Volts dc. These functions are provided to 62 pin and 72 pin connectors. A ready line (I/O CHRDY), available on the I/O channel, allows operation of slow I/O at memory devices. If the channel's ready line is not activated by an addressed device, all processor generated memory read and write cycles take a clock cycle byte. All processor generated I/O read and write cycles require five clock cycles/byte. All DMA transfers require five clock cycles/byte. Refresh cycles are present once every 13.02 ms to satisfy DRAM refresh requirements. Channel 0 of the DMA controller is used for DRAM refresh. I/O devices are address using I/O mapped address space. A Parity Error line (PTRYERR) exists for reporting error conditions to the 8088 processor on the DRAM/ROM Board Assembly. Activation of this line results in a NMI to the processor.

4-75. CRT Video Board Assembly (A10) (Figure 6-13).

4-76. The CRT Video Board Assembly (Figure 4-11) includes the high voltage and control circuitry for the Video Display CRT. Circuit operation is described in the following paragraphs.

4-77. VIDEO AMPLIFIER. The Video Amplifier consists of Q201, Q202, and associated circuitry. A positive pulse is amplified and inverted by both transistors Q201 and Q202 and then, injected to the cathode of the Video Display through R901, C201 compensates for the high frequency or the Video Amplifier and VR602 controls the screen brightness at the Video Display. D201 and C210 are used as a spot killer when the power source is cut off.

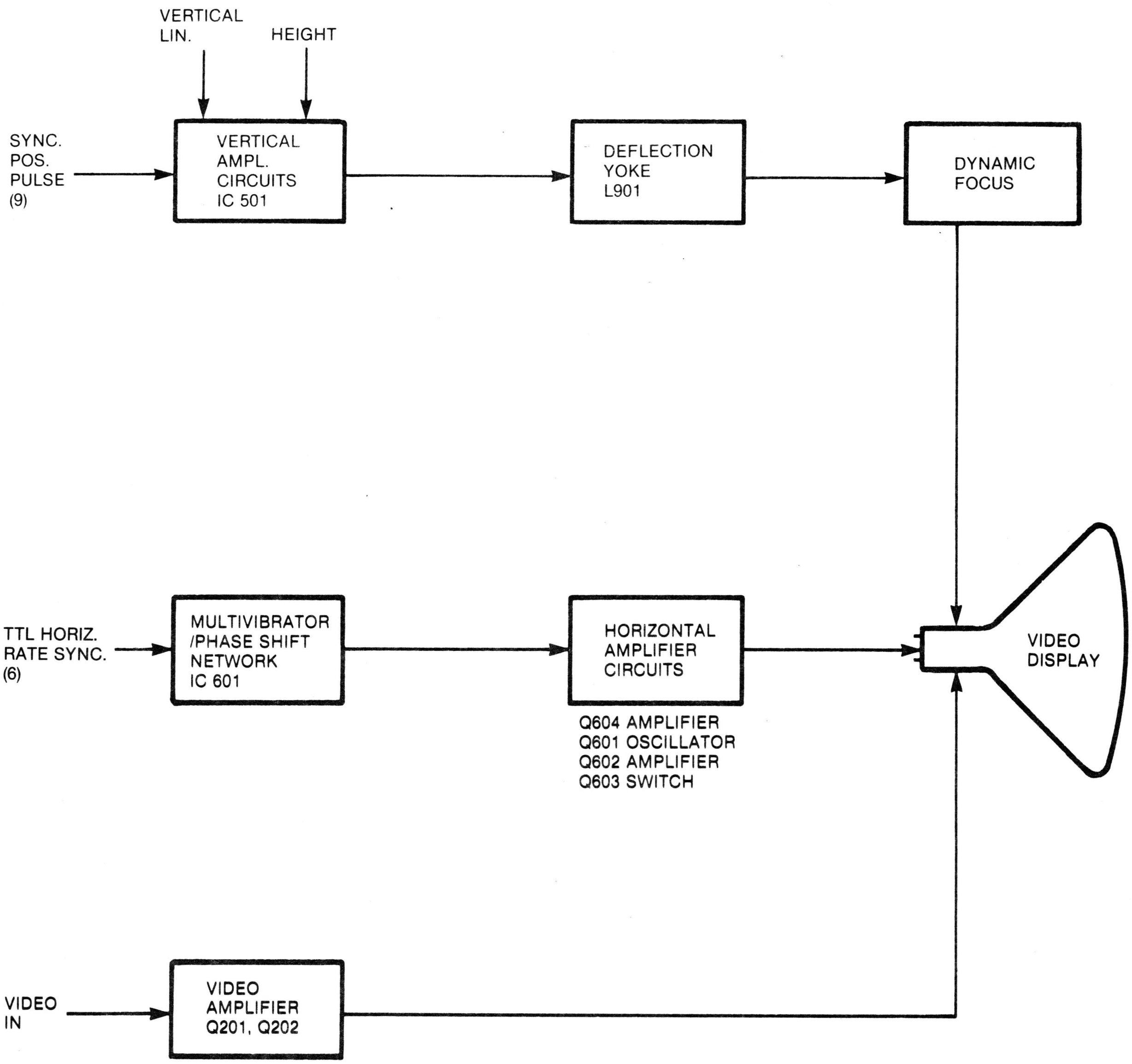

VERTICAL
LIN.
HEIGHT
SYNC.
POS.
PULSE
(9)
VERTICAL
AMPL.
CIRCUITS
IC 501
DEFLECTION
YOKE
L901
DYNAMIC
FOCUS
TTL HORIZ.
RATE SYNC.
(6)
MULTIVIBRATOR
/PHASE SHIFT
NETWORK
IC 601
HORIZONTAL
AMPLIFIER
CIRCUITS
Q604 AMPLIFIER
Q601 OSCILLATOR
Q602 AMPLIFIER
Q603 SWITCH
VIDEO
DISPLAY
VIDEO
IN
VIDEO
AMPLIFIER
Q201, Q202

Figure 4-11. CRT Video Board Assembly (A10) Simplified Block Diagram.

4-78. VERTICAL CIRCUIT. The synchronous positive pulse from input pin 9 is applied to pin 5 of IC501. The vertical free running frequency is determined by R507, R508, C510, and VR503 and is directly synchronized to the above synchronous pulse. As a result the rectangular pulse is generated at pin 4 of IC 501 and is integrated into a sawtooth waveform by R509 and C511 and passes to pin 7 through R502, VR502, and C502. Vertical linearity and height are controlled by VR501 and VR502 respectively. The output at pin 1 is sent to L901 (the Deflection Yoke) through C512, Q551 functions as ripple filter for the vertical circuit.

4-79. PHASE SHIFT CIRCUIT. The phase shift circuit includes IC601 and peripheral circuitry. The TTL horizontal rate sync is coupled to the input of IC601 through R671 and C674. Jumpers J671 and J672 select positive or negative respectively. Two monostable multivbrators are included in IC601, the time constant of one which is determined by R672, VR601 and IC671. The action of the circuitry causes a positive pulse to appear at pin 13 of IC601. The leading edge of the pulse coincides with selected leading edge of horizontal sync signal and the falling edge, determined by VR601, triggers the second multivibrator; the time constant of which, controlled by R673 and C672, regenerates a positive pulse (about 5 microseconds) at pin 5. D671 stabilizes the supply voltage (5 Volts) to IC601.

4-80. HORIZONTAL CIRCUIT. AFC circuit consists of Q604, D601, D602, and associated circuitry. The horizontal synchronous pulse is amplified and separated by Q604 and the comparison pulse (fed back from T602) is supplied to D601 and D602 and phase compared. The output of the AFC circuit is applied to Q601 through the smoothing circuit of C607, C608, and R608 and controls the oscillation frequency of Q601. The modified Hartley oscillator (Q601 and associated circuitry) free running frequency is determined by L601, C609, and R609. The output of Q602 passes to the horizonal output circuit consisting of Q603, D603, L901, T602, and associated circuitry. Q603 operates as a switch and when the transistor receives a driving pulse supplies a sawtooth signal to L901. D603 is a damper diode. C617 is a resonance capacitor. The 12 Volts dc is boosted by D604 and C620. The output pulse of T602 is rectified by D607, D606, and D605 for the Video Display dynamic focusing circuits, video amplifier, and brightness circuits respectively. L603 and L604 control the width and horizontal linearity.

4-81. DYNAMIC FOCUS. The dynamic focusing circuit consists of T603 and peripheral circuitry. The parabolic waveform shaped by C621 is boosted by T603. The amplitude of the parabolic waveform (determined by R665) is superposed on the DC voltage adjusted by Focus VR (VR603) and applied to the Video Display.

4-82. Disk Drive No. 1 (Drive A) (A11) (Figure 6-14).

4-83. The Disk Drive (Figure 4-12) is an electromechanical driver unit that provides some of the necessary control electronics and amplification circuitry for the read and write functions of the disk programs. The assembly functioning is as follows.

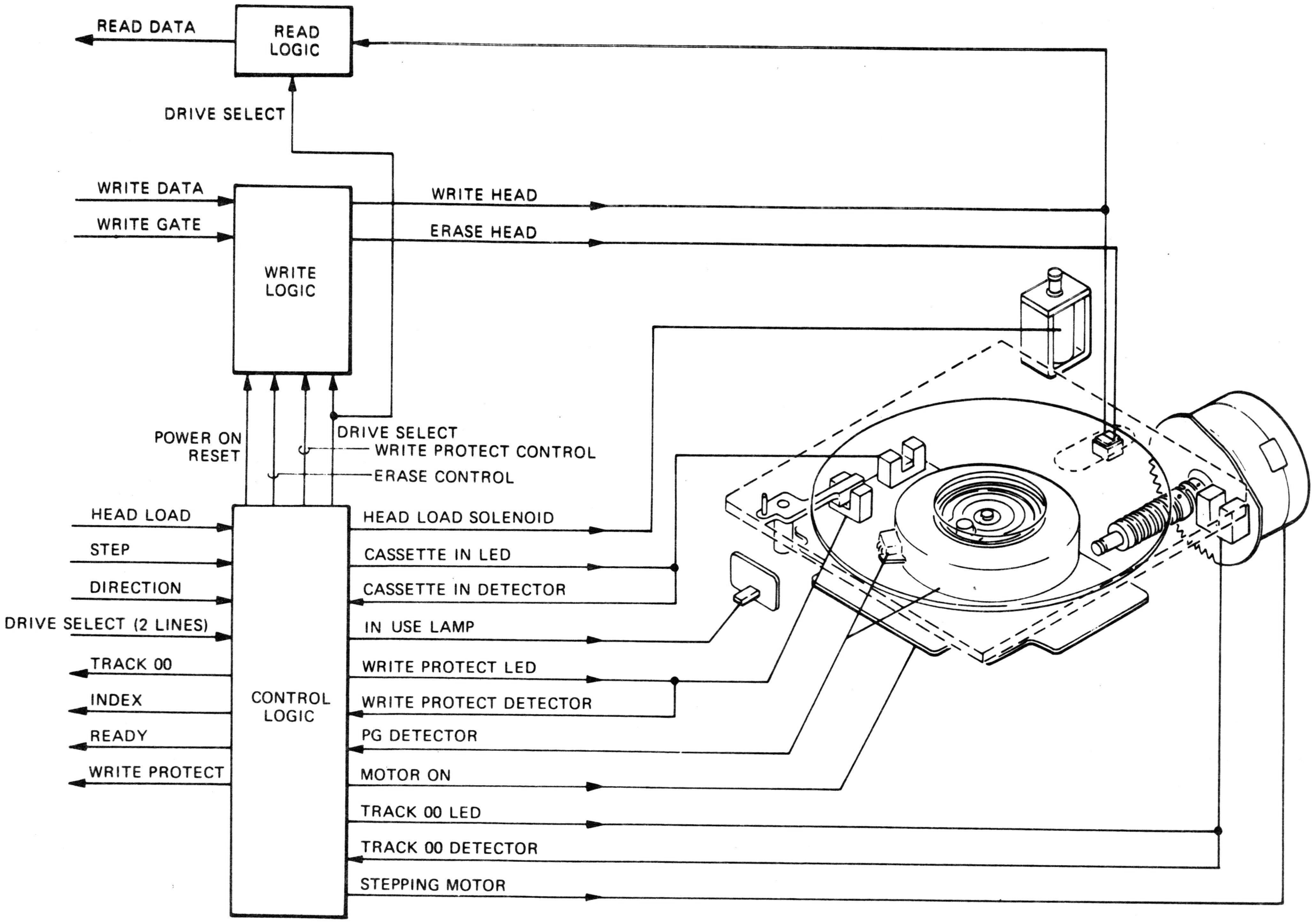

READ DATA
READ LOGIC
DRIVE SELECT
WRITE DATA
WRITE GATE
WRITE LOGIC
WRITE HEAD
ERASE HEAD
POWER ON RESET
DRIVE SELECT
WRITE PROTECT CONTROL
ERASE CONTROL
HEAD LOAD
STEP
DIRECTION
DRIVE SELECT (2 LINES)
TRACK 00
INDEX
READY
WRITE PROTECT
CONTROL LOGIC
HEAD LOAD SOLENOID
CASSETTE IN LED
CASSETTE IN DETECTOR
IN USE LAMP
WRITE PROTECT LED
WRITE PROTECT DETECTOR
PG DETECTOR
MOTOR ON
TRACK 00 LED
TRACK 00 DETECTOR
STEPPING MOTOR

Figure 4-12. Disk Drive (A11,A12) Simplified Block Diagram.

4-84. READ/WRITE AND CONTROL ELECTRONICS. The Disk Drive has the following electronic components.

a) Index Circuits
b) Head Position Actuator Driver
c) Head Load Actuator Driver
d) Read/Write Amplifier and Transition Detector
e) Write Protect
f) Drive Ready Detector Circuit
g) Drive Select Circuits
h) In Use Lamp Circuits

4-85. DRIVE MECHANISM. The brushless direct drive motor rotates the spindle at 600 rpm. The Disk Drive has no Motor On Control signal that conventional 5.25 inch drives have and the drive motor rotates only while the disk is inserted. There is no index hole in the disk, because the Disk Drive positions the disk precisely and an index pulse is generated by a photo sensor and hall element combination.

4-86. POSITIONING MECHANISM. To achieve accuracy in track positioning, the head is positioned by a needle screw mechanism and a stepping motor (Head Position Actuator) is controlled through a special control method for the best performance. The stepping motor rotates the lead screw clockwise or counterclockwise in 45 degree increments. A 45 degree rotation of the lead screw moves the read/write head one track position. When the +5 Volt and the +12 Volt power is applied, the Head Positioning Actuator positions the read/write head at TRACK00. If the head is positioned at TRACK69, the STEP IN command is rejected.

4-87. DISK CHUCKING MECHANISM. A new medium utilizes a centering metal hub which maintains Track positioning accuracy without causing eccentricity or chucking wear.

4-88. READ/WRITE HEAD. The Disk Drive head is a single element ceramic read/write head with a tunnel erase head to provide erased areas between data tracks. The data track width is 125 microns and guard band width is 63 microns.

4-89. RECORDING FORMAT. The format of the data recorded on the disk is a function of the host system, and takes advantage of the total available bits that can be written on any one track of the Computer.

4-90. INITIALIZATION. Almost all functions of the Disk Drive are controlled by the Disk Drive CPU. The CPU is reset about 150 microseconds after +5 Volts is supplied. Before the CPU is reset, all the output levels go high. When the CPU is reset, the following will occur:

1) Since a current flows into all phases of the stepping motor, the stepping motor is halted.

2) The In-Use lamp comes on.

3) If the drive select signal goes high and the drive has been selected, the TRACK 00 signal, the READY signal, and the WRITE signal go high.

When resetting is completed, the CPU makes the READY signal low and the stepping motor positions the head at TRACK 00. The stepping motor needs +12 Volts to be driven. So, the Disk Drive should continue to supply +12 Volts until resetting is completed. As long as +12 Volts is supplied, it holds the +5 Volts supply off while the CPU is being reset and the disk motor is stopped. After resetting is completed, the motor, on command from the CPU, drives the disk motor.

4-91. READ CIRCUIT. The read circuit consists of a step-up transformer, a differentiator, a flat amplifier, a low pass filter, a comparator, and a time domain filter and a drive select circuit. During the read operation a very low output voltage, induced by the read/write head, is amplified by the step-up transformer. Then, the pulse is shifted by the differentiator, so that the peak points of the read waveform is transformed to zero-crossing points. The voltage is again amplified by the flat amplifier and unwanted high frequency components are eliminated by the low pass filter. The output voltage is transformed to rectangular waveform by the comparator. Then, the effect caused by the low frequency signal (IF signal) is eliminated by the time domain filter. Finally, the waveform is supplied to the outside only when the drive select signal is high.

4-92. WRITE CIRCUIT. The write circuit consists of a write power switch, a write flip-flop, a write driver, and an erase power switch. The write power switch supplies a write current to the write/read head when the drive is ready for write and the WRTGATE signal is high. The WRTDATA pulse supplied from outside is latched by the write flip-flop and changes the direction of the current flowing in the read/write head by switching the write driver. Two erase heads, which are separated by a distance equivalent to the width of the read/write head, are located approximately 0.8 millimeters away from the read/write head. The CPU displays the WRTGATE signal so that erase power switch operation is delayed.

4-93. CONTROL CIRCUIT. The control circuit consists of a signal input circuit, a signal output circuit, a sensor circuit, and a function control circuit. The following are the functions of each circuit.

a) Signal input circuit
    1) Drive select
    2) Head Load
    3) Step
    4) Direction

b) Signal output circuit
    1) Index
    2) Track 00
    3) Write protect
    4) Ready

c) Sensor Circit
    1) Track 00 sense circuit
    2) Cassette-in sense circuit
    3) Write Protect sense circuit
    4) Low power sense circuit

- d) Function control circuit
    - 1) Index generation circuit
    - 2) Stepping motor control circuit
    - 3) Head load plunger control circuit
    - 4) In-Use lamp circuit
    - 5) Power on reset circuit
    - 6) Erase on control circuit
    - 7) Write enable control circuit

4-94. For higher reliability, the Disk Drive includes photo interrupters to detect TRACK 00, Cassette-In, and Write-protect. The low power sense circuit prevents the disk from being written or erased when the voltage is unstable during the on/off operation. Unlike a conventional Disk Drive with an index hole, this assembly utilizes a pulse (one pulse per turn) generated by the disk motor as the Index pulse.

4-95. The stepping motor using four-phase stepping motor rotates 45 degrees (equals three pulses) every time the head moves one track. The CPU uses a control method to minimize the track access time and the step settling time. It also decreases the supply voltage for lower power consumption when the head does not move. Similarly, the CPU supplies +12 Volts to the head load plunger only when the plunger is being loaded and decreases +12 Volts to +5 Volts for lower power consumption when the plunger is loaded.

4-96. The in-use lamp indicates that the floppy disk is in use. It comes on when the head is loaded.

4-97. The power-on reset circuit assures normal operation of the CPU. When the rise time of the +5 Volts is less than 150 microseconds, the CPU operates normally.

4-98. The erase on the control circuit is used to erase both sides of the track during the write operation. It begins erasing approximately 260 microseconds after the write commmand is given with WRITE GATE signal and completes erasing approximately 530 microseconds after writing is completed.

4-99. The write enable control circuit is used to permit or inhibit data-writing. Writing is permitted when the drive is selected, the disk is not write-protected, the head is loaded, and the motor is in operation.

4-100. DISK MOTOR CIRCUIT. The spindle is driven by the brushless DC direct motor. The chucking mechanism is pressed onto the shaft of the dc motor and precisely positions a disk, since the positioning accuracy of the mechanism is dependent only on the shaft diameter. The dc motor is a One-Sensor Two-Phase Motor with a speed servo control on the rotor to detect the speed of the motor and control the motor operation.

4-101. To detect cassette-in and write protect, two photo interrupters are mounted on the DC motor servo board. Due to the special chucking mechanism, the motor generates an index pulse without a detecting hole on the disk.

4-102. WRITE ERROR. If an error occurs during a write operation, it will be detected on the next revolution by automatically doing a read operation ("WRITE CHECK"). To correct the error, another write and write check operation must be done. If the write operation is not successful after ten attempts, a read operation should be attempted on another track to determine if the media or the drive is failing. If the error still persists, the disk should be considered defective and discarded.

4-103. READ ERROR. Most errors that occur will be "soft" errors; that is, by performing an error recovery procedure, the data can be recovered.

Soft errors are usually caused by:

a) Airborne contaminants that pass between the read/write head and the disk. These contaminants will generally be removed by the cartridge self-cleaning wiper.

b) Random electrical noise which usually lasts for a few microseconds.

c) Small defects in the written data and/or track not detected during the write operation which may cause a soft error during a read.

4-104. The following procedures are recommended to recover from the previously mentioned soft errors:

a) Reread the track ten times or until such time as the data is recovered.

b) If data is not recovered after using step a, move the head to the adjacent track in the same direction previously moved, then return to the original track.

c) Repeat step a.

d) If data is not recovered, the error is not recoverable.

4-105. Disk Drive No. 2 (Drive B) (A12) (Optional) (Figure 6-14).

4-106. Same as Disk Drive No. 1, see previous paragraph.

SECTION V

MAINTENANCE

5-1. INTRODUCTION.

5-2. This section contains instructions for servicing the Computer. All maintenance procedures in this section should be performed by qualified service personnel. The procedures assume that the service person is familar with the operation of the instrument and the controls. The maintenance procedures are divided as follows:

- Operating Checks - verifies the correct operation of the Computer. If the instrument operates incorrectly, refer to the Troubleshooting paragraphs.
- Adjustments - provides information for adjusting or aligning parts of the Computer. Perform the adjustment only if the instrument fails one of the operating checks and/or after replacing an assembly.
- Preventive Maintenance - Describes the cleaning and inspection procedures to insure proper instrument operation.
- Troubleshooting (Diagnostics) - Includes procedures to help isolate a trouble to an assembly and/or a circuit board and, in some cases, to specific areas on a circuit board.
- Disassembly, Repair and Assembly - Provides instruction for the mechanical disassembly, repair and assembly of the Computer.

CAUTION

BE CAREFUL THAT NOTHING FALLS INTO THE PRINTER MECHANISM WHEN CHANGING PAPER OR WHEN PERFORMING ANY MAINTENANCE OPERATION ON THE ASSEMBLY SINCE THE ITEM COULD SLIP THROUGH THE PRINTER FRAME ONTO THE CIRCUIT BOARDS BELOW AND DAMAGE THE CIRCUIT BOARDS. WHEN THE COMPUTER IS MOVED. IN PARTICULAR MAKE SURE THAT HARDWARE, WIRES, PAPER CLIPS OR COINS ARE NOT PLACED ON THE TOP OF THE INSTRUMENT WHERE THEY COULD ACCIDENTLY SLIDE OR BE PUSHED INTO THE PAPER ACCESS OPENING.

NOTE

Perform all tests at normal room temperature and humidity for accurate results.

5-3. TEST EQUIPMENT AND SPECIAL TOOLS.

5-4. Test equipment and special tools required for maintenance procedures outlined in this service manual are described in Table 5-1. Equivalents can also be used when available. Standard hand tools are also required.

WARNING

SOME MAINTENANCE PROCEDURES ARE PERFORMED WITH POWER APPLIED AND THE COVER REMOVED FROM THE COMPUTER. BE CAREFUL WHEN PERFORMING THESE PROCEDURES. SEE FIGURE 5-1 FOR PRECAUTIONARY INFORMATION.

CAUTION

MANY ELECTRONIC COMPONENTS CAN BE DAMAGED OR DESTROYED BY ELECTROSTATIC DISCHARGES. THESE COMPONENTS INCLUDE SCHOTTKY AND MOS CIRCUITRY, DOPED SILICON FUNCTION DEVICES AND THIN FILM RESISTORS. DAMAGE CAN OCCUR IN THESE DEVICES EVEN WHEN MOUNTED ON A CIRCUIT BOARD WITH PROTECTIVE CIRCUITRY.

5-5. INITIAL CHECKOUT.

5-6. This paragraph describes the initial checkout procedures for the Computer and should include the diagnostic tests of the diagnostic disk listed in Table 5-1. Any differences between the proper results or measurements described in the procedures and the actual results from the instrument undergoing the test indicates a possible problem. Refer to the adjustments or troubleshooting paragraphs if the results are not correct.

NOTE

When the system disk is used, the System Video Display should show the program revision, the copyright information and other program data. The display should also include the present date and time. If the Computer display does not show the proper date and time, turn off the power and remove the top housing using the instructions in paragraph 5-48. Then use the VOM to check the battery voltage on the DRAM/ROM Board Assembly (See Figure 5-2). The voltage should be approximately 2.8 or 3.6 volts dc depending upon which type of battery has been used. If the voltage measured is 0.6 volts dc less than the battery nominal voltage, the battery should be replaced. Note that the battery voltage must be checked with the System power turned off. After replacing the battery if the date or time or both are incorrect, enter the present date and time using the format of the displayed date and/or time and press [RETN] after each entry. The A: prompt should appear on the Video Display.

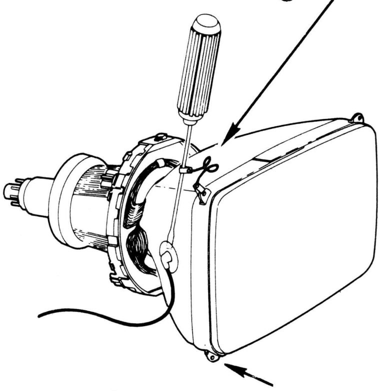
SAFETY WARNING

Be careful when working around or handling the Video Display tube as rough handling or a sharp blow may cause the tube to implode. Any undue external pressure on glass, especially on the thin neck portion, should be avoided. Always wear safety glasses. In case of Video Display tube replacement use a tube of the same type number specified. The use of a Video Display tube type other than the one specified may cause an increase of X-ray radiation.

WARNING

SERVICE ON THIS COMPUTER SHOULD BE PERFORMED ONLY BY EXPERIENCED SERVICE PERSONNEL WHO ARE FAMILAR WITH THE MAINTENANCE AND REPAIR OF SIMILAR EQUIPMENT. SOME PARTS IN THIS COMPUTER HAVE SPECIAL SAFETY RELATED CHARACTERISTICS FOR X-RAY RADIATION PROTECTION. FOR CONTINUED SAFETY, THE PARTS SHOULD BE REPLACED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. WHEN REPLACING THE VIDEO DISPLAY TUBE OF THE COMPUTER ALWAYS MAKE SURE THAT ALL THE PROTECTIVE DEVICES ARE INSTALLED CORRECTLY. THESE DEVICES INCLUDE INSULATING COVERS, BARRIERS, STRAIN RELIEFS AND SPECIAL GROUND STRAPS. WHEN PERFORMING ANY RESISTANCE MEASUREMENT REPAIR OR REPLACEMENT PROCEDURES WITH THE COMPUTER COVER REMOVED, MAKE SURE THAT THE LINE CORD IS DISCONNECTED FROM THE INSTRUMENT AND THAT THE HIGH VOLTAGE CIRCUITRY OF THE VIDEO DISPLAY TUBE IS DISCHARGED AS SHOWN IN THE FOLLOWING ILLUSTRATION.

Connect the wire between the Video Display Tube ground strap and the screwdriver to discharge the High Voltage.



1. Clamp one end of the wire to the screwdriver metal blade and the other end to the Video Display tube ground strap.

2. Hold the insulated handle of the screwdriver and touch the end of the metal blade to the inner metal conductor of the Video Display tube high voltage lead as shown.

Make sure that the mounting lugs and implosion protection band of the Video Display tube are grounded to the Video Display Tube conductive coating with a grounding wire.

Figure 5-1. Precautionary Information.

ITEM NAME	MANUFACTURER	PART NUMBER	APPLICABLE TEST, REPAIR OR ADJUSTMENT/USE	SPECIFICATIONS
Oscilloscope	Tektronix	Model 465 Model 2336	Encoder, Encoder Sensor	50mV/division to 50 V/division sensitivity, 5us/div. horizontal sweep capability
VOM	Fluke or Weston	Model 1900A Model 7320	Print Head	Capable of resolution to 100mV and 1 Ohm
Screwdriver/ Nut Driver	Xcelite	99PS-50	Printer Assy. and Front Panel Assy.	Screwdirver and nut driver set with 5 inch extension shaft
Inspection Mirror	Commercial Source		Inspection of Disk Drive cabling Removing screws	----
Extender Boards	Vector Sylmar, CA	3690-4	Extend plug-in circuit boards for test purposes	36 pin foil circuit board
Light, Non-Detergent Machine Oil	Commercial Souce	---	Carriage Bar lubrication	
Lint Free Cloth or Tissue	Commercial Source	---	Carriage Bar lubrication	
Shims	Commercial Source	---	Printhead and Solenoid alignment	Solenoid - 0.015 inch Printhead - 0.040 inch, 0.022 and 0.030 inch

Table 5-1. Maintenance Materials, Test Equipment And Special Tools (Sheet 1 of 3).

ITEM NAME	MANUFACTURER	PART NUMBER	APPLICABLE TEST, REPAIR OR ADJUSTMENT/USE	SPECIFICATIONS
Phillips Torque Screwdriver	Commercial Source	---	Torque of #4 Printhead screws	24 inch-ounces
Feeler Gauge	Commercial Source	---	Printhead and Solenoid	0.008 to 0.030 inch (Printhead clearance 0.01 to 0.02)
Force Guage	Chatillon Gauge-R	Cat.#516-500	Measure paper feed belt tension Measure carriage belt tension Measure printhead pressure	0.045 inch at 1 ounce 0.160 inch at 1 ounce 175 to 200 grams
Miniature Soldering Iron	ESICO, Inc.	9230	Component Replacement	30 Watts, 1/8 in tip diameter
Epoxy	Devcon	5-min. Epoxy	Encoder, Encoder Sensor Solenoid	
Screw Locking Fluid	Computer Devices Inc.	620-24	Solenoid Screws, Printhead Assembly Screws	
DOT Diagnostic Disk	Computer Devices Inc	0002-14732-21	Troubleshooting Software	
Soldapulit	Techni Tool	DS017	Component replacement, must be anti-static	
Isopropyl Alcohol	Commercial Source	---	Cleaning Printhead	

Table 5-1. Maintenance Materials, Test Equipment And Special Tools (Sheet 2 of 3).

ITEM NAME	MANUFACTURER	PART NUMBER	APPLICABLE TEST, REPAIR OR ADJUSTMENT/USE	SPECIFICATIONS
Cotton Swabs	Commercial Source	---	Cleaning printhead and sensors	
Small Brush	Commercial Source	---	Removing dust from Computer	
Liquid dishwashing Detergent	Commercial Source	---	Cleaning Computer case, housings and Keyboard Assembly	
Soft Cloths	Commercial Source	---	Cleaning Computer case, housings and Keyboard Assembly	
Loopback Cable	Computer Devices	0098-20015	Diagnostic Test Cable for Computer RS-232-C connectors	See Figure 8-1
Damping Grease	Computer Devices	0622-00006	To dampen mechanical noise and lubricate the Solenoid linkage and head pressure bar pivot points.	

Table 5-1. Maintenance Materials, Test Equipment And Special Tools (Sheet 3 of 3).

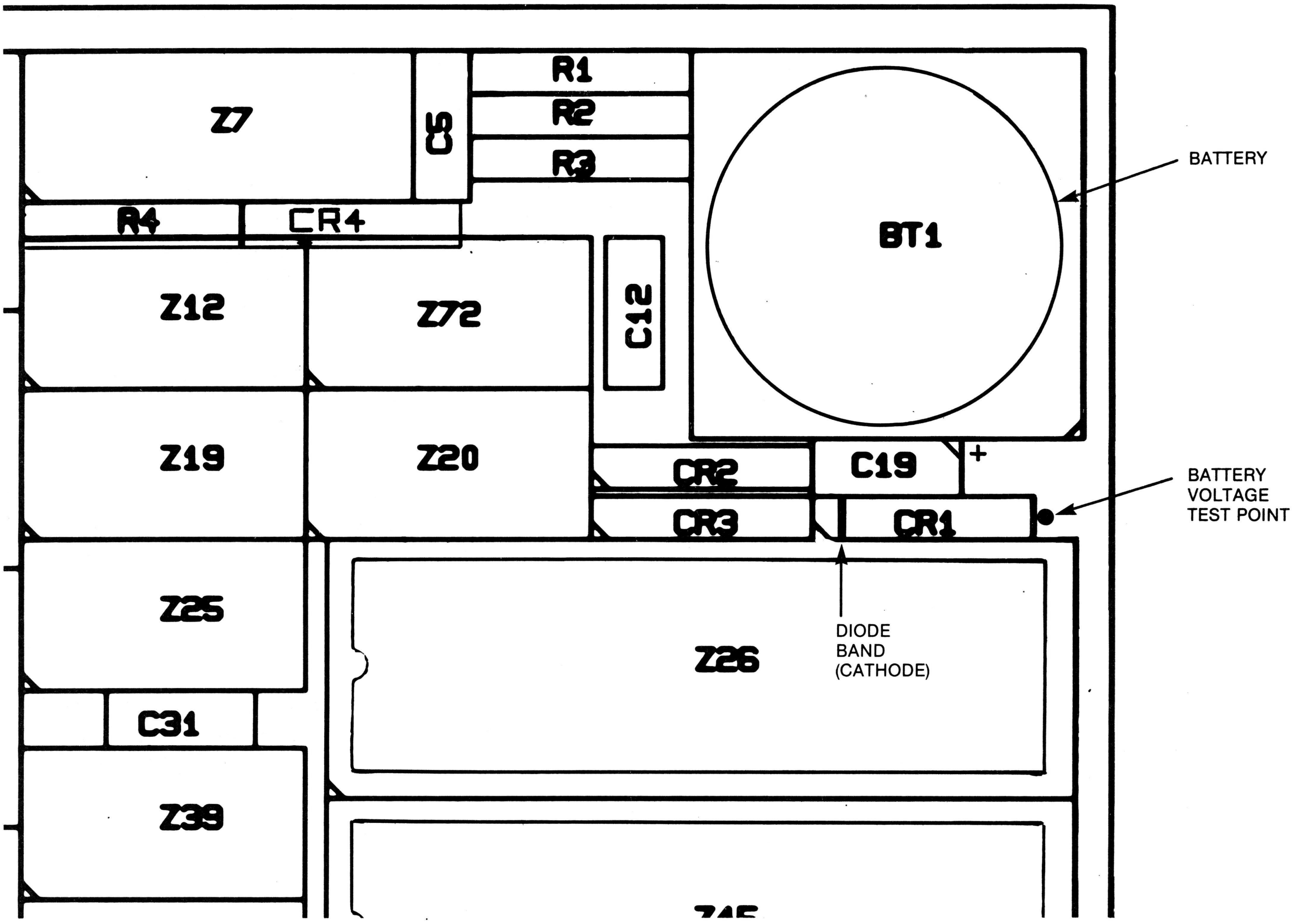

Z7
C5
R1
R2
R3
BT1
BATTERY
R4
CR4
Z12
Z72
C12
Z19
Z20
CR2
C19
+
BATTERY
VOLTAGE
TEST POINT
CR3
CR1
Z25
Z26
DIODE
BAND
(CATHODE)
C31
Z39

Figure 5-2. Battery Test Point.

5-7. Operational Checks.

5-8. Use the following as a preliminary troubleshooting operation to check the instrument for proper operation.

> NOTE
> Always record the Computer configuration status before performing any maintenance procedures. Make sure that the Computer is returned to this status when procedures are complete.

a. Connect the Computer power cord to an ac outlet and turn on the instrument. The following should happen:

1. The indicator(s) on the front of the Disk Drive(s) should light momentarily and then go out.

2. The Printer Assembly, if supplied, should do a carriage return and a paper feed.

> NOTE
> The power up diagnostic is executed when the instrument is powered up and a subset executed when the system is reset. The word "TESTING" will flash on the Video Display a number of times.

3. After a short period of time the power up (ROM based) diagnostics should be complete and the start up menu should appear on the Video Display. Generally, if the power up diagnostics are successfully completed, the extended diagnostics or the disk based diagnostics can be run.

> NOTE
> If, when performing the following steps, the computer does not respond as described, press the reset button at the rear of the instrument and repeat the start up procedure from the beginning.

b) Either insert the diagnostic disk in drive A (left) and type the proper number from the menu to load the computer system from drive A or select the proper number from the initial menu for the extended diagnostics. Refer to Section VII for information on the diagnostic test operation (Table 7-2 for the power-up and extended diagnostics, Table 7-3 for the disk diagnostics).

> NOTE
> Remember to slide the metal door open on the disk and to insert the disk into the drive with the cut corner on the top.

c) Stop the diagnostic test procedures by following the display instructions or by pressing the rear panel RESET button for the disk based diagnostic or following the instruction on the Video Display for the power-up and extended diagnostics.

d) If the computer runs the diagnostic program successfully, the instrument is operating properly. If error messages are displayed, the problem area for the extended diagnostics may be located by using the data in Table 7-1 or 7-2 or if the disk based diagnostics are used, the problem may be located by using the data in the Troubleshooting Guide (Table 5-3) or Table 7-3. If problems with the Video Display are obvious (horizontal or vertical hold, brightness, centering or picture distortion) refer to paragraph 5-32A.

5-9. Mechanical Printer Assembly (Optional) Check.

5-10. If the operational checks of the previous paragraph indicate a problem in the Printer Assembly adjustments, use the following steps to locate the problem area. Refer to the appropriate paragraph for the measurement procedure if required.

a. Disconnect the instrument from the ac power source.

b. Remove the top housing from the Computer (See paragraph 5-48) and remove the paper from the Printer Assembly.

c. Check the operation of the carriage motor drive gears by turning one of the gears by hand. The gears should move so that the teeth do not slip or bind.

d. Use the instruction of paragraph 5-13 to check the carriage drive belt tension with the printhead carriage at either end of the shaft. The center of the belt should move approximately 0.160 inch with one ounce of pressure. Adjust in accordance with paragraph 5-13 if necessary.

e. Use the instructions of paragraph 5-13 to check the paper feed drive belt tension. The center of the belt should move approximately 0.045 inch with one ounce of pressure. Adjust in accordance with paragraph 5-13 if necessary.

f. Use the instructions of paragraph 5-13 to check the printhead gap/solenoid throw with the printhead carriage in the "home" position. The gap should be 0.015 plus or minus 0.005 inch. If adjustment is necessary, see paragraph 5-13.

g. Check the paper drive gear rotational movement. The drive mechanism should rotate easily with no binding.

h. Use the instructions of paragraph 5-13 to check the paper guide gap. The clearance at the ends of the paper guide and the platen paper entrance/exit bar should be 0.008 to 0.010 inch. If adjustment is required, see paragraph 5-13.

i. Check the paper loading operation. The paper should load easily.

j. Use the instructions of paragraph 5-13 to check the load bar head pressure. There should be between 175 and 200 grams of pressure on the printhead from the bar. Adjust in accordance with paragraph 5-13.

k. After adjustment operations are complete, repeat the Operational Checks of paragraph 5-7. If the problem is still present, refer to paragraph 5-39 (Troubleshooting).

5-11. Printer Assembly (Optional) Printhead Check.

5-12. If instrument operation is acceptable but only part of the letters or numbers are printed on paper or the printout is light on parts (not all) of the symbols, the printhead should be check using the following procedure.

a. Turn off the Computer power switch (rear panel) and remove the line plug from the ac source.

b. Remove the Computer top housing (see paragraph 5-48 for instructions) and then connect the instrument to the ac source.

WARNING

DANGEROUS VOLTAGES ARE ACCESSABLE WHEN OPERATING THE INSTRUMENT WITHOUT THE COVER IN PLACE. BE CAREFUL.

CAUTION

1. THE THERMAL PRINTHEAD OF THE COMPUTER RELIES ON CONTACT WITH PAPER TO ABSORB HEAT. FOR THIS REASON, THE INSTRUMENT PRINTER SHOULD NOT BE USED WITHOUT PAPER INSTALLED OR WITHOUT PRESSURE ON THE PRINTHEAD (FROM THE LOADING BAR) AS THIS COULD RESULT IN DAMAGE TO THE PRINTHEAD.
2. TURN OFF THE COMPUTER POWER ON-OFF SWITCH BEFORE CONNECTING OR DISCONNECTING AC POWER OR REMOVING OR REPLACING ANY OF THE ASSEMBLIES OR PARTS.

c. Move the printhead carriage assembly to the right (motor) side of the printer. Position the carriage over the paper feed roller.

d. Insert a small flat blade screwdriver into the right corner at the front of the connector holding the printhead flex cable in place. Twist the handle of the screwdriver until the connector pops open and releases the flex cable.

e. Using the VOM as an ohmmeter, connect one lead to one of the thick conductors on the flex cable (ground or common). Set the meter to a low (0 to 100 ohms) resistance range.

f. Touch the other ohmmeter lead to each of the other eleven thinner leads (each one is connected to a dot on the printhead). Each measurement should be between 29 and 32 ohms.

g. If any resistance measurement is not correct, replace the printhead (see paragraph 5-31).

5-13. ADJUSTMENTS.

5-14. The internal control settings and mechanical adjustments for the Computer are normally done at Computer Devices Inc., during final test or during installation and initial operating procedures, and should not need any changes except when instrument repairs are made. If this occurs, refer to the following adjustment procedures and perform the operation most closely related to the problem area. If more than one adjustment is required, perform the procedures in the order listed. Torque values for common hardware for the instrument are listed in Table 5-2. Only those adjustments that can be performed without special test equipment are described.

5-15. Printhead Density (Darkness) Control Adjust (Optional Printer Assembly).

5-16. Perform the following steps to adjust the printhead density.

a. Remove the power from the Computer (power switch off) and then remove the top housing (cover) from the Computer. Refer to paragraph 5-48 for instructions.

b. Turn on the Computer and press [SHIFT - PRT SCRN] so that the start up statement is printed out. If the printhead density (darkness) is not acceptable, adjust the potentiometer (R17) (see Figure 5-3) and repeat this step until the darkness (counter clockwise to darken and clockwise to lighten) is satisfactory.

Material To Be Secured

SCREW SIZE	MILD STEEL TORQUE VALUE	BRASS TORQUE VALUE	NYLON TORQUE VALUE
2-56	2.2 in-lbs	2 in-lbs	18 in-oz
4-40	4.7 in-lbs	4.3 in-lbs	24 in-oz
6-32	8.7 in-lb	7.9 in-lbs	30 in-oz
8-32	17.8 in-lbs	16.2 in-lbs	5 in-lbs
10-2	21 in-lbs	19 in-lbs	6 in-lbs
10-32	30 in-lbs	26 in-lbs	7 in-lbs
1/4-20	65 in-lbs	61 in-lbs	13. in-lbs
1/4-28	90 in-lbs	77 in-lbs	

SPECIAL TORQUE VALUES

LOCATION	TORQUE VALUE
*Printer Assembly hex mounting nuts to Base Cabinet Assembly standoffs (4 ea 8-32 nuts)	11 to 13 in-lbs
*Floppy Fan And Speaker Assembly mounting hardware (to Base Cabinet Assembly)(2 ea 6-32 X 0.44" screws)	7.5 to 8.5 in-lbs
*Fan/AC Bracket Assembly mounting hardware (to Base Cabinet Assembly)(3 ea 6-32 x 0.44" screws)	7.5 to 8.5 in-lbs
*I/O Mother Board Assembly to Base Cabinet Assembly mounting screws (9 ea 4-20 x 0.38" screws)	3 to 4 in-lbs
*Print Head Assembly to carriage mounting screws	23.5 to 24.5 in-oz
*Top Housing Assembly to Base Cabinet Assembly hardware (4 ea 6-32 x 0.44" screws)	6 to 8 in-lbs
*CRT Video Board Assembly to Base Cabinet Assembly hardware (4 ea 4-20 x 0.38" screws)	3 to 4 in-lbs
*Power Supply Mounting hardware (2 ea 6-32 x 0.25" screws)	6 to 8 in-lbs
*Front Panel Assembly to Base Cabinet Assembly hardware (6 ea 6-19 x 0.38" screws)	6 to 8 in-lbs

NOTE

Only the printhead mounting screws must be torqued. All other values listed are to be used as guidelines.

Table 5-2. Torque Specifications For Common Hardware.

5-17. Carriage Belt Tension Adjustment (Optional Printer Assembly).

5-18. Perform the following steps to adjust the carriage belt tension.

a. Turn off the Computer using the rear panel power switch and remove the power cord plug from the ac power source.

b. Remove the top housing (cover) using the instructions in the disassembly procedure (paragraph 5-48).

c. Move the printhead carriage assembly to the home (left) position.

d. Use the Force Gauge to press the flat side of the carriage drive belt towards the back of the instrument with approximately one ounce of pressure (see Figure 5-4). The belt should move approximately 0.016 inch.

e. If the measurement result of step d is not correct, use a 11/32 inch wrench and loosen the hex nut on the carriage drive belt outboard (idler) gear assembly.

f. Set the tension of the carriage drive belt by adjusting (sliding) the gear assembly in the slot as necessary.

g. Torque the hex nut in accordance with Table 5-2.

h. Check the carriage belt to make sure that the tension is still correct.

CAUTION

DO NOT INCREASE THE BELT TENSION OVER THE SPECIFIED AMOUNT OR THE BELT WILL BIND. DO NOT DECREASE THE BELT TENSION BELOW THE SPECIFIED AMOUNT OR THE BELT WILL SLIP.

5-19. Paper Drive Belt Tension Adjustment (Optional Printer Assembly).

5-20. Use the following steps to adjust the paper drive (line feed) belt tension:

a. Turn off the Computer using the rear panel power switch and remove the power cord plug from the ac power source.

b. Remove the top housing (cover) using the instructions in the disassembly procedure (paragraph 5-48).

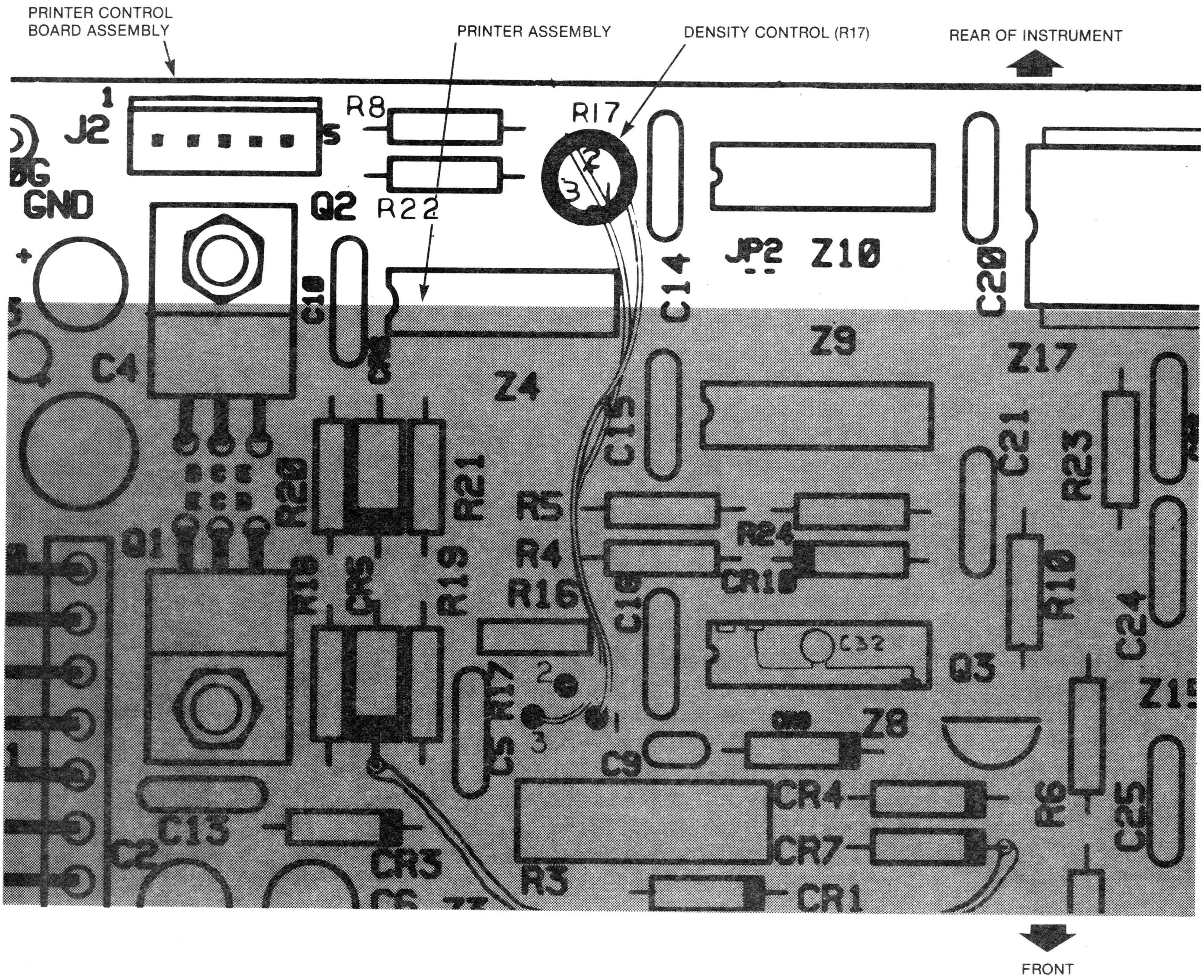
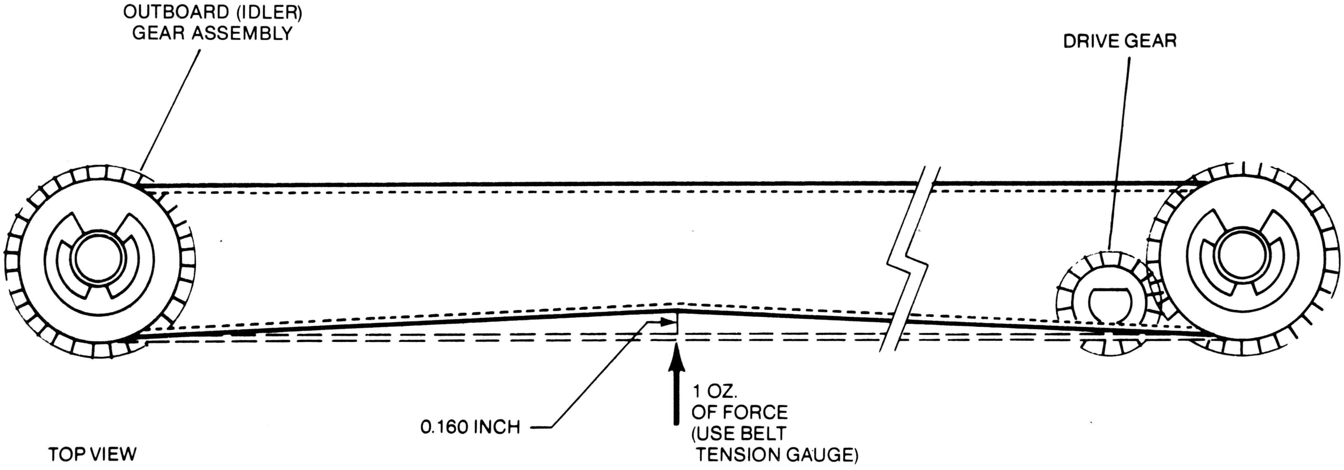
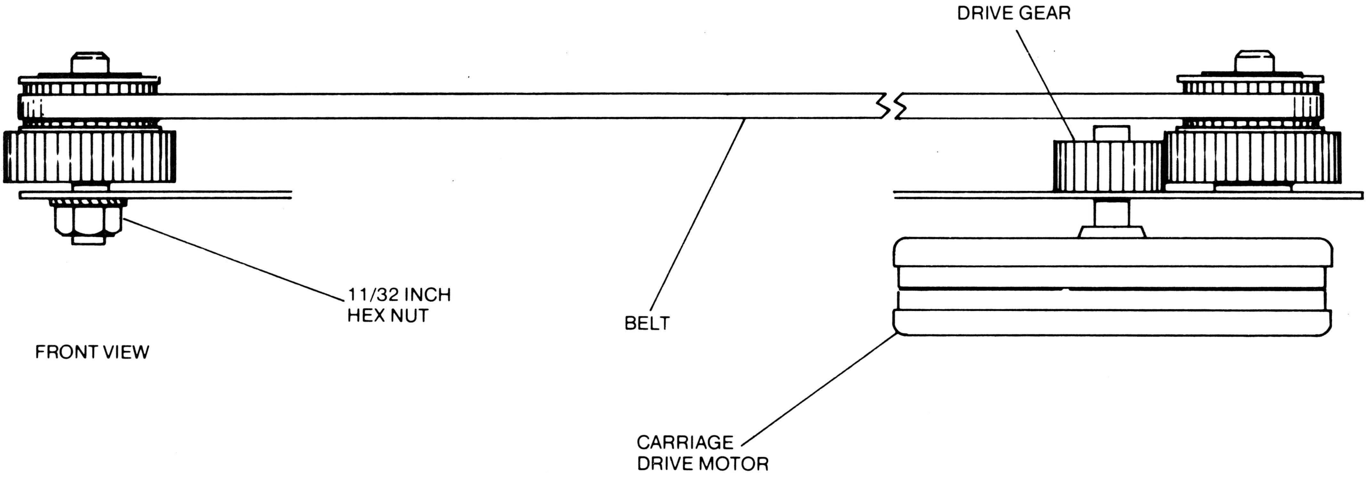

PRINTER CONTROL BOARD ASSEMBLY
PRINTER ASSEMBLY
DENSITY CONTROL (R17)
REAR OF INSTRUMENT
FRONT
J2
GND
R8
R17
Q2
R22
JP2
Z10
C14
C20
C4
Z4
Z9
Z17
C15
C21
R23
R20
R21
R5
R4
R24
CR10
R10
Q1
R19
R16
C16
C32
Q3
C24
Z15
C5
C9
Z8
CR4
CR7
R6
C25
C13
C2
CR3
C6
R3
CR1

Figure 5-3. Printhead Density Control Location.


OUTBOARD (IDLER)
GEAR ASSEMBLY
DRIVE GEAR
0.160 INCH
1 OZ.
OF FORCE
(USE BELT
TENSION GAUGE)

TOP VIEW


DRIVE GEAR
11/32 INCH
HEX NUT
BELT
CARRIAGE
DRIVE MOTOR

FRONT VIEW

Figure 5-4. Carriage Belt Tension Adjust.

c. Press down at the mid-point of the paper drive belt with approximately one ounce of pressure (see Figure 5-5). The belt should move approximately 0.045 inch.

d. If the measurement result of step c is not correct, loosen the phillips head adjust screw (Figure 5-6) on the motor.

e. Adjust the belt tension by shifting the motor as necessary.

f. Torque the adjust screw in accordance with Table 5-2.

g. Check the paper drive belt to make sure that the tension is correct.

5-21. Solenoid Throw (Printhead Gap) Adjustment (Optional Printer Assembly).

5-22. Perform the following steps to adjust the solenoid on the Printer Assembly:

a. Turn off the Computer using the rear panel power switch and remove the power cord plug from the ac power source.

b. Remove the top housing (cover) using the instructions in the disassembly procedure, paragraph 5-48.

c. Remove the paper and paper roll (if any) from the Printer Assembly.

d. Move the printhead to either side of the platen.

e. Bottom and hold the solenoid plunger into the solenoid body and then check the clearance between the printhead and the platen (Figure 5-6). The clearance should be approximately 0.015 inch.

f. Move the printhead to the opposite side of the platen and repeat the measurement of step e.

g. If either measurement results in a clearance outside of the limits of step e, perform the following adjustment.

h. Remove the paper drive motor by removing the two attaching screws and slipping the drive belt off of the motor pulley.

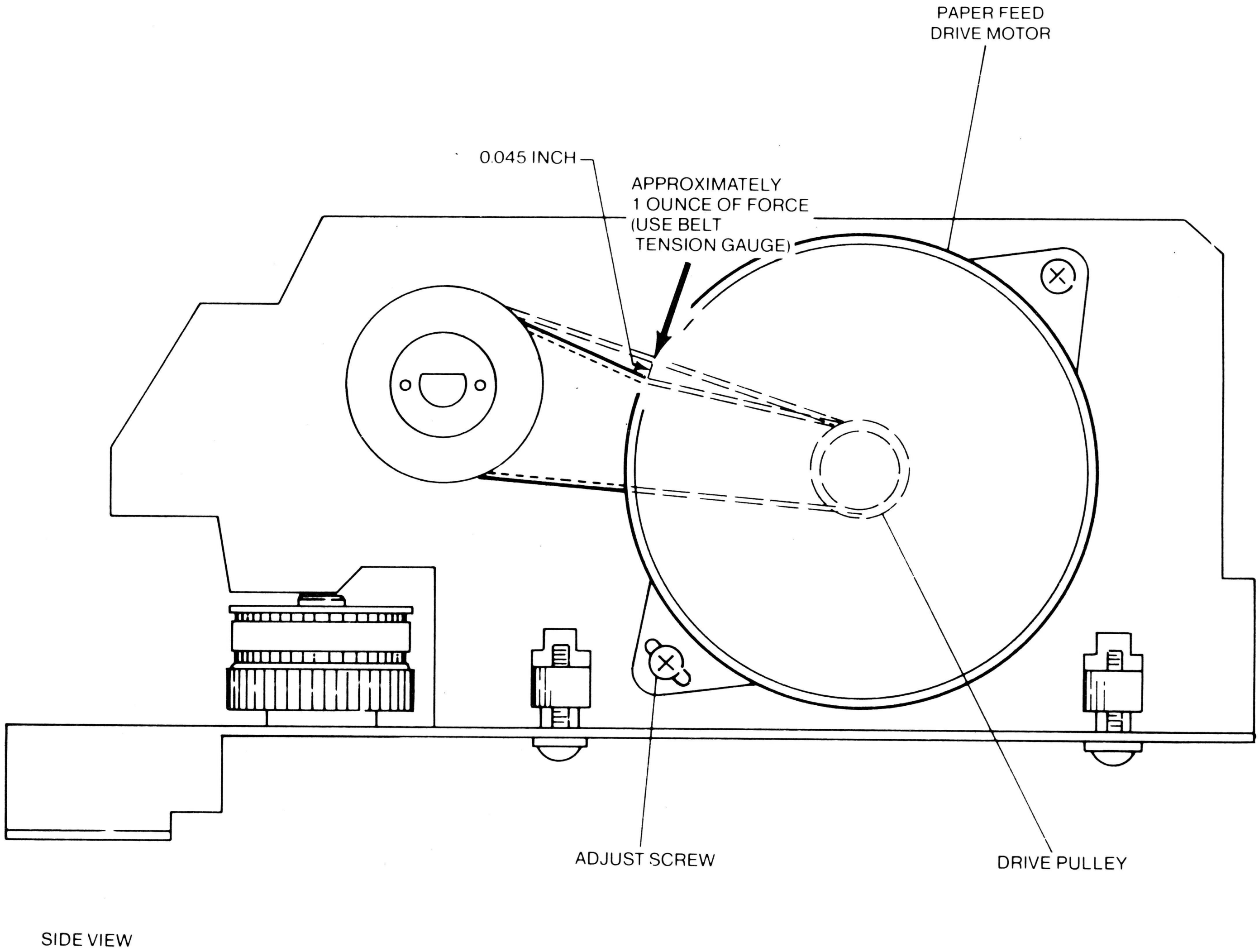

PAPER FEED
DRIVE MOTOR
0.045 INCH
APPROXIMATELY
1 OUNCE OF FORCE
(USE BELT
TENSION GAUGE)
ADJUST SCREW
DRIVE PULLEY
SIDE VIEW

Figure 5-5. Paper Drive Belt Tension Adjust.

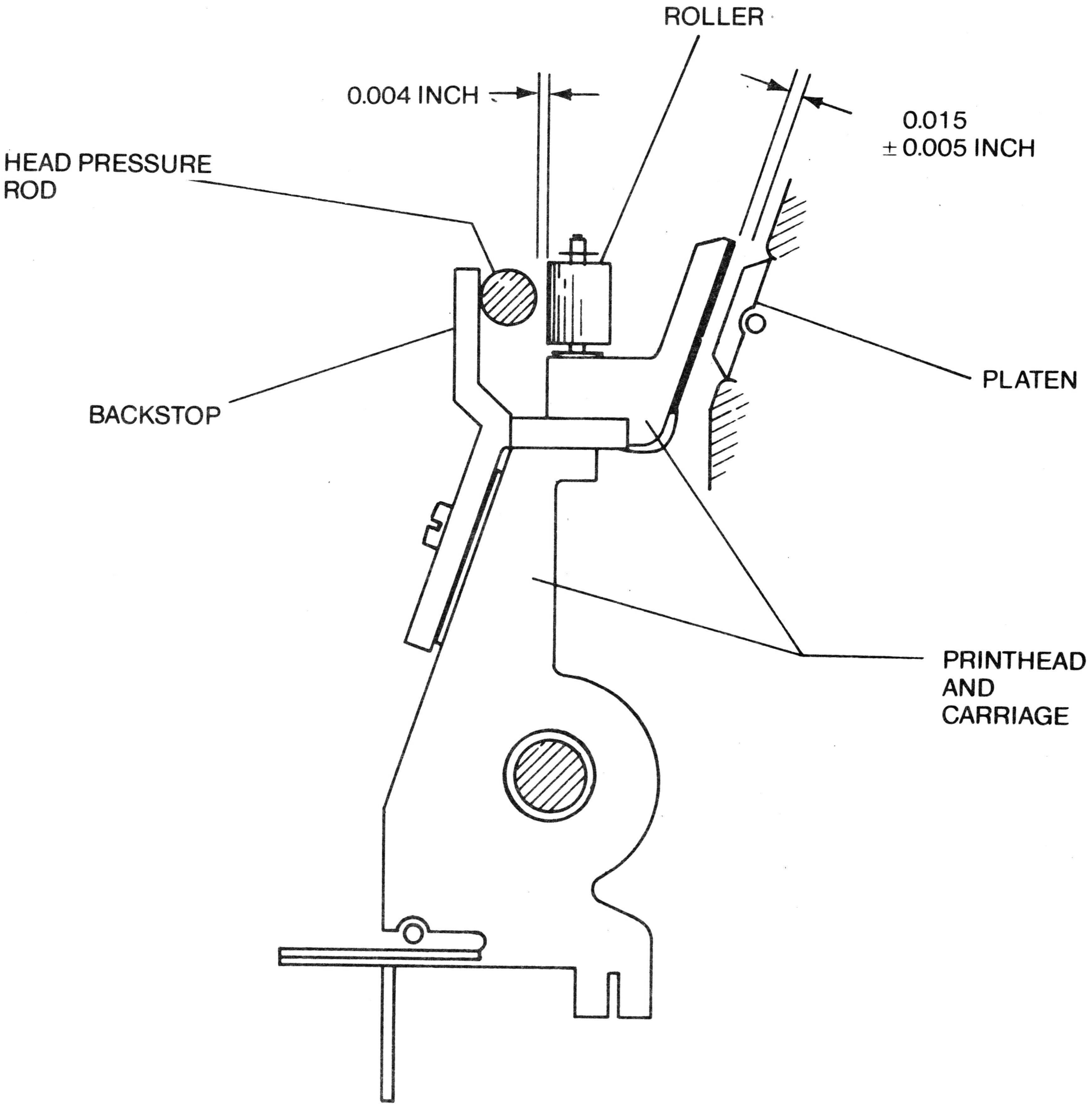

ROLLER
0.004 INCH
0.015
± 0.005 INCH
HEAD PRESSURE
ROD
BACKSTOP
PLATEN
PRINTHEAD
AND
CARRIAGE

Figure 5-6. Printhead Gap Adjustment.

i. Loosen the solenoid attaching screws on the inside of the paper tray.

j. Move the printhead to the center of the platen.

k. Place a 0.015 inch shim between the printhead and the platen and hold the head, shim and platen together with a small clamp. Insert a 0.004 inch shim between the printhead roller and the head pressure rod.

l. Bottom and hold the solenoid plunger into the solenoid housing and move the solenoid body until the head pressure rod makes contact with the back stop of the printhead carriage.

m. Tighten solenoid mounting screws using standard torque specifications (Table 5-2) for 4-40 screws.

n. Repeat steps a through g until the clearance is within the limits.

o. After completing the adjustment, seal (with screw locking fluid) the solenoid mounting screws to the printer side plates. Apply a small amount of damping grease to the Solenoid linkage (see paragraph 5-38C) if necessary.

p. Install the paper drive motor and adjust the paper drive belt tension (see paragraph 5-19).

5-23. Paper Guide Gap Adjustment (Optional Printer Assembly).

5-24. Perform the following step to adjust the paper guide gap:

a. Turn off the Computer using the rear panel power switch and remove the power cord plug from the ac power source.

b. Remove the paper from the Computer if installed.

c. Measure the gap between the paper guide and the platen at each end of the paper slot as shown in Figure 5-7. The gap should be between 0.010 and 0.030 inch.

d. If the gap spacing is not correct, the paper guide must be adjusted in accordance with the following procedure.

e. Remove the top housing using the instructions in paragraph 5-48.

f. Loosen the two screws as shown in Figure 5-7 and shift the paper guide as required to get the proper gap.

g. When the gap is within the limits of step c, tighten the screws.

5-25. Printhead Load Bar Pressure Adjustment (Optional Printer Assembly).

5-26. Perform the following steps to adjust the printhead load bar pressure:

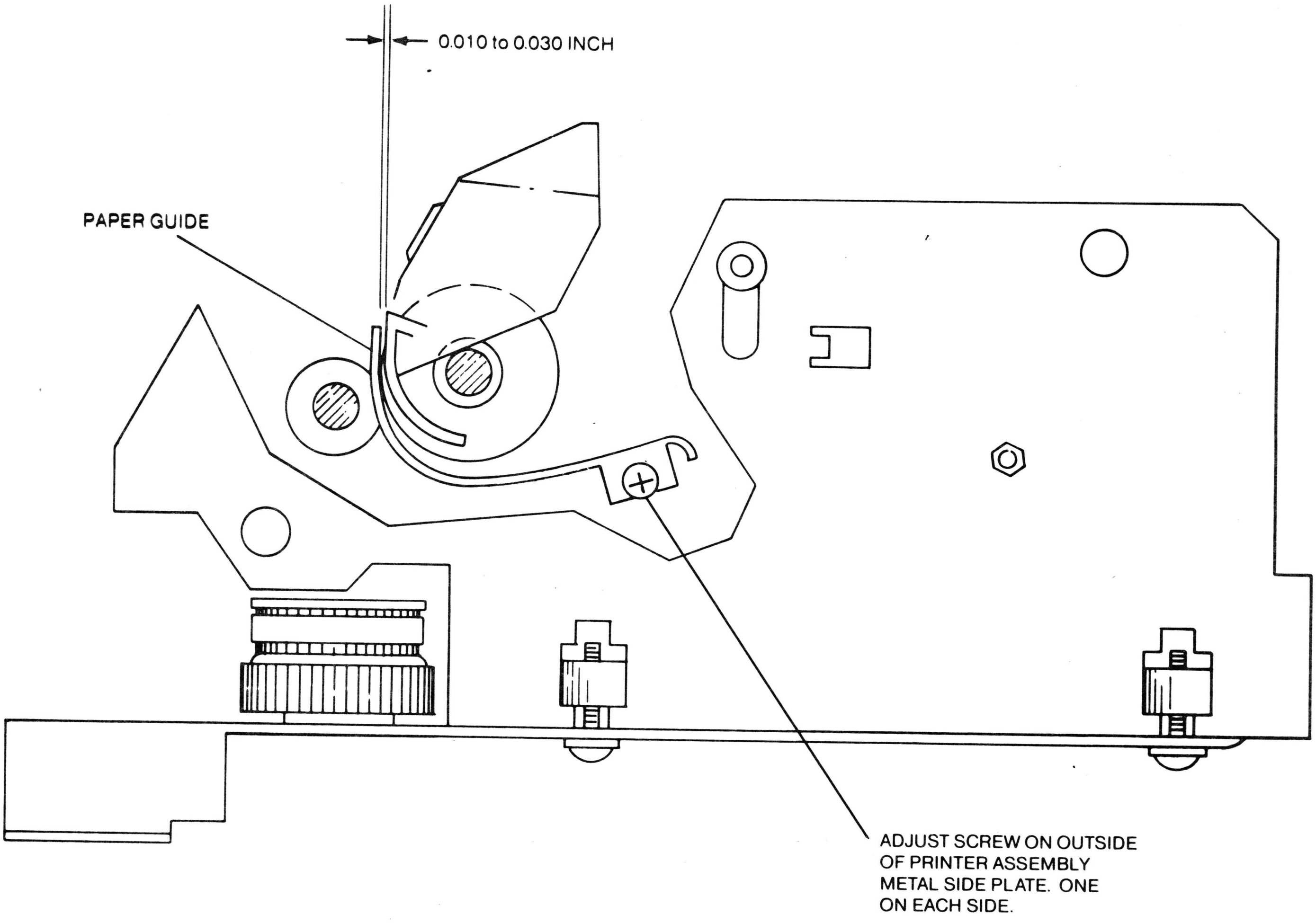

0.010 to 0.030 INCH
PAPER GUIDE
ADJUST SCREW ON OUTSIDE OF PRINTER ASSEMBLY METAL SIDE PLATE. ONE ON EACH SIDE.

Figure 5-7. Paper Guide Gap Adjustment.

a. Move the carriage to the center position of the platen.

b. Insert a one inch square piece of printer paper behind the printhead as shown in Figure 5-8. Then attach the gauge to the center terminal of the roller.

c. Pull gently on the paper while pulling the gauge away from the printhead slowly. Note the gauge indication just as the printhead leaves the platen (paper slips out from under the printhead). The gauge should indicate between 175 and 200 grams.

d. If the gauge reading is not correct, replace the springs at the ends of the load bar. See Figure 6-9 for identification and location of the springs.

5-27. Encoder Sensor Adjustment (Optional Printer Assembly).

5-28. Perform the following steps to adjust the encoder sensor:

CAUTION

DO NOT MOVE THE ENCODER SENSOR ADJUSTMENT SCREW MORE THAN ONE COMPLETE TURN IN EITHER DIRECTION. IF THE PRINTER OUTPUT IS STILL INCORRECT THE PRINTER ASSEMBLY SHOULD BE REPLACED.

NOTE

This adjustment is normally required when the printer output is light in the reverse direction only. Try adjusting the printhead using the instructions in paragraph 5-31 steps p through n before performing this adjustment.

a. Turn off the Computer using the rear panel power switch and remove the power cord plug from the ac power source.

b. Remove the top housing (cover) using the instructions in the disassembly procedures, paragraph 5-48.

c. Loosen the two 4-40 X 1/4 inch attaching screws that secure the encoder mounting plate (Figure 5-9) to the Printer Assembly shims so that the plate is free to move to the left or right.

d. Connect the Computer to ac power and turn on the power switch.

e. While the printer is running, adjust the optical switch/encoder mounting plate assembly by turning the adjusting rod (Figure 5-9) until the printout is equal in darkness in both directions. In other words the printing should be the same intensity when the printhead is outputting in either direction.

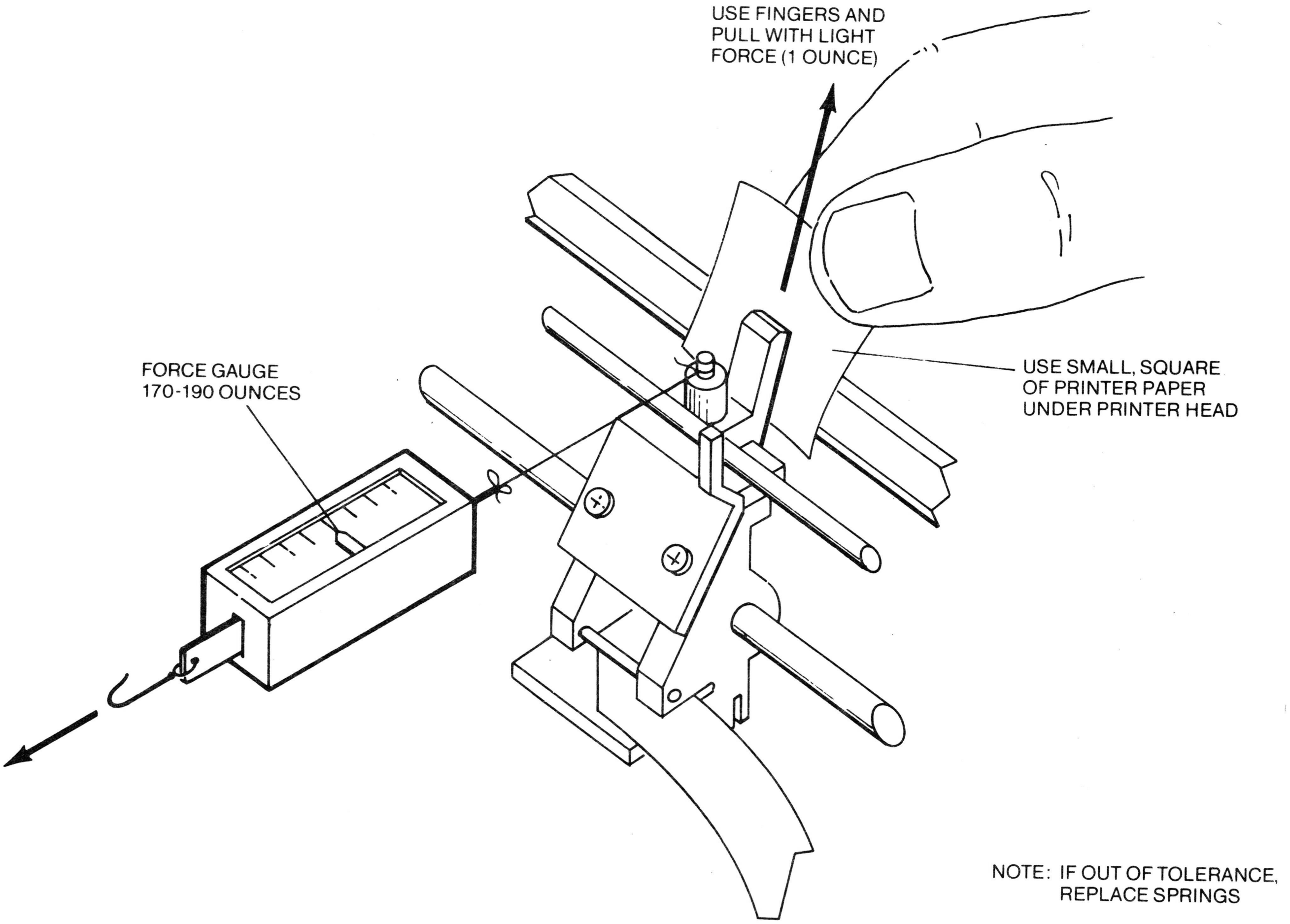

USE FINGERS AND
PULL WITH LIGHT
FORCE (1 OUNCE)
FORCE GAUGE
170-190 OUNCES
USE SMALL, SQUARE
OF PRINTER PAPER
UNDER PRINTER HEAD
NOTE: IF OUT OF TOLERANCE,
REPLACE SPRINGS

Figure 5-8. Printhead Load Bar Pressure Adjustment.

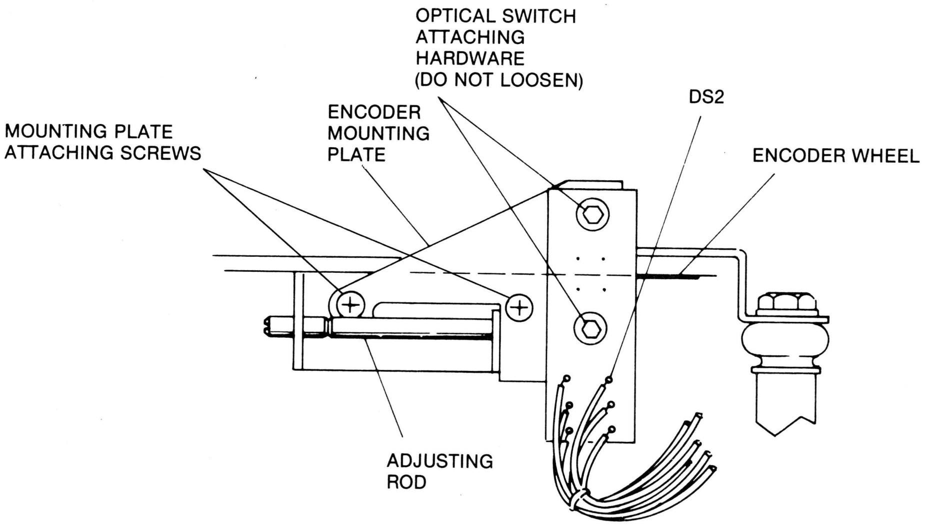

OPTICAL SWITCH ATTACHING HARDWARE (DO NOT LOOSEN)
DS2
ENCODER MOUNTING PLATE
MOUNTING PLATE ATTACHING SCREWS
ENCODER WHEEL
ADJUSTING ROD

Figure 5-9. Encoder Sensor Adjustment.

f. Tighten the encoder mounting plate hardware using the torque values of Table 5-2 as a guide. Make sure that the print intensity is still equal in both directions.

g. Check that the encoder wheel still does not hit the sides of the optical switch gap.

h. Epoxy the screw ends, nuts and the adjusting rod threads and assemble the instrument.

5-29. Home Position Sensor Adjustment (Optional Printer Assembly).

5-30. Use the following steps to adjust the home position sensor. This sensor controls the starting point of the left margin printing.

a. Turn off the Computer using the rear panel power switch and disconnect the power cord from the ac power source.

b. Remove the top housing (cover) using the instructions in the disassembly procedure of paragraph 5-48.

c. Loosen the screws holding the home position sensor in place (Figure 5-10) and shift the body of the sensor to the right or left as desired.

NOTE

The home position sensor is normally installed in the left mounting slots (the Power Supply Assembly side) and pushed to the right side of the slots.

d. Tighten the screws to a torque of 24 inch-ounces.

5-31. Printhead Replacement and Adjustment (Optional Printer Assembly).

5-32. The printhead assembly are used on the Computer is an adjustable type and consists of two parts. Perform the following steps to replace and/or adjust the printhead.

NOTE

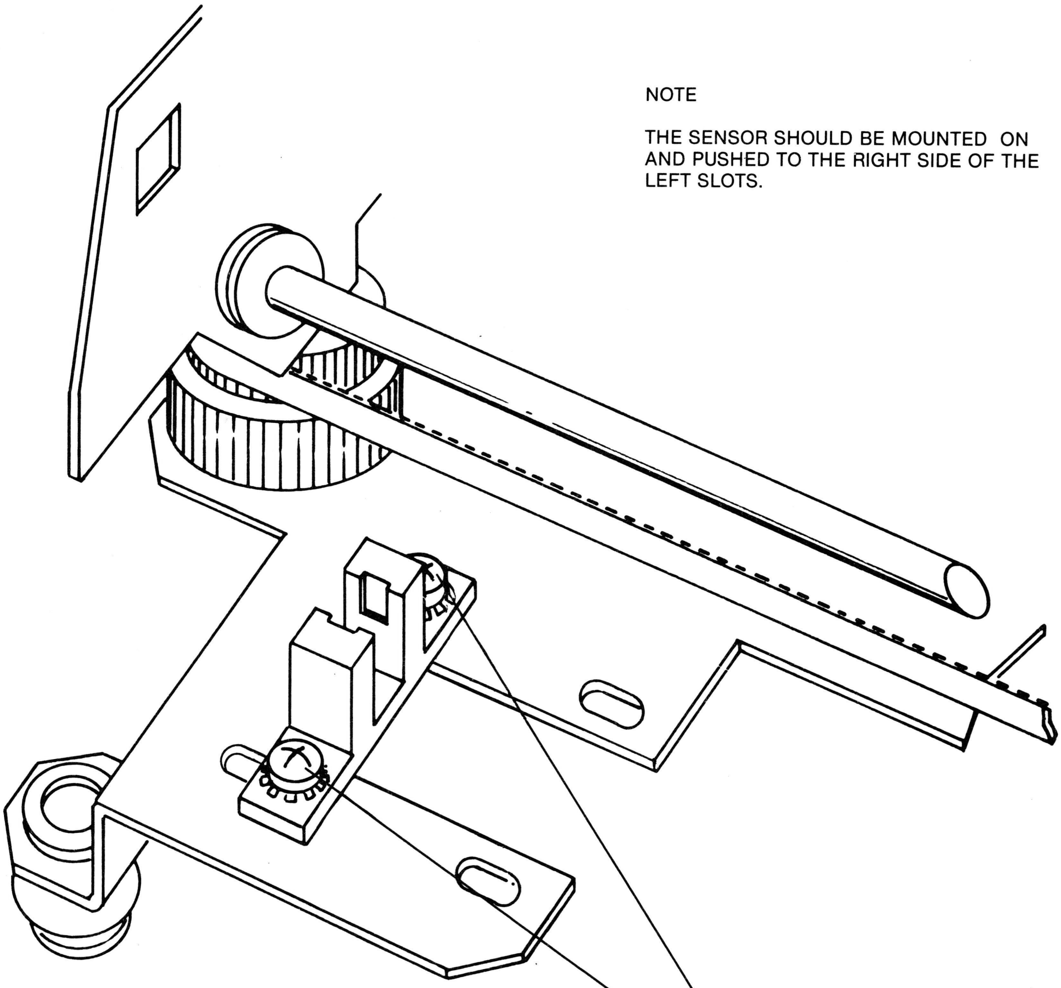
The adjustable printhead has a groove on the side that faces towards the Printer Assembly carriage.

a. Turn off the Computer power (rear panel power switch in the off position) and remove the ac plug from the wall outlet.

b. Remove the top housing (cover) from the Computer. Use the instructions in paragraph 5-48.

c. Position the printhead assembly carriage to the right side of the Printer Assembly over the paper roller drive wheel.

d. Perform steps b through e of paragraph 5-54 to remove the Printer.



NOTE

THE SENSOR SHOULD BE MOUNTED ON AND PUSHED TO THE RIGHT SIDE OF THE LEFT SLOTS.

LOOSEN TWO SCREWS
AND SHIFT BODY
OF SENSOR IN SLOTS

Figure 5-10. Home Position Sensor Adjustment.

e. Remove the printhead assembly flex cable from the Printer Control Board Assembly by opening the connector (J3)(See paragraph 5-11, step d.4) and removing the end of the flex cable (Figure 5-11).

f. Use a small probe at the base of the printhead assembly carriage to push out the printhead assembly carriage cable retaining pin that holds the flexible cable in place (Figure 5-11).

g. Remove the two screws holding the printhead assembly to the carriage and remove the printhead assembly.

h. Place the hump of the metal pivot plate in the groove at the back of the printhead assembly body and using 1/2-inch screws (2-56 X 1/2), install the replacement printhead and metal pivot plate. Do not tighten the two screws at this time.

CAUTION

MAKE SURE THAT THE FLEXIBLE CABLE IS NOT BETWEEN THE METAL PIVOT PLATE AND THE PRINTHEAD ASSEMBLY.

i. Install a 0.022 inch shim at the left (power supply) side of the printhead between the printhead and the metal pivot plate.

j. Tighten the left screw to a torque of 24 inch-ounces.

k. Repeat steps i and j at the right side of the printhead.

l. Remove the shims from both sides of the printhead and torque the left side to 24 inch-ounces again.

NOTE

Do not loosen either screw to remove the shims.

m. Install the printhead carriage pin from the left side of the carriage so that it passes over the crease of the flexible printhead cable into the hole on the right side.

n. Insert the printhead assembly flex cable foil into the front of the Printer Control Board circuit board connector (J3) and clamp the connector top down onto the foil.

o. Position the Printer Assembly onto the mounting studs and connect the Power Supply and the I/O Mother Board multipin plugs to connectors J1 (larger) and J2 (small) respectively on the Printer Assembly Control Board. Secure the Printer Assembly with the four 5/16-inch hex nuts removed in step d.

p. Operate the Computer as required for a printout from the Printer and check the quality of the printout. If the print quality needs improvement (uneven characters, left to right) adjust the printhead assembly by tightening the right screw (with the torque screwdriver set at 24 inch-ounces) and eighth to a quarter turn and check the print quality again.

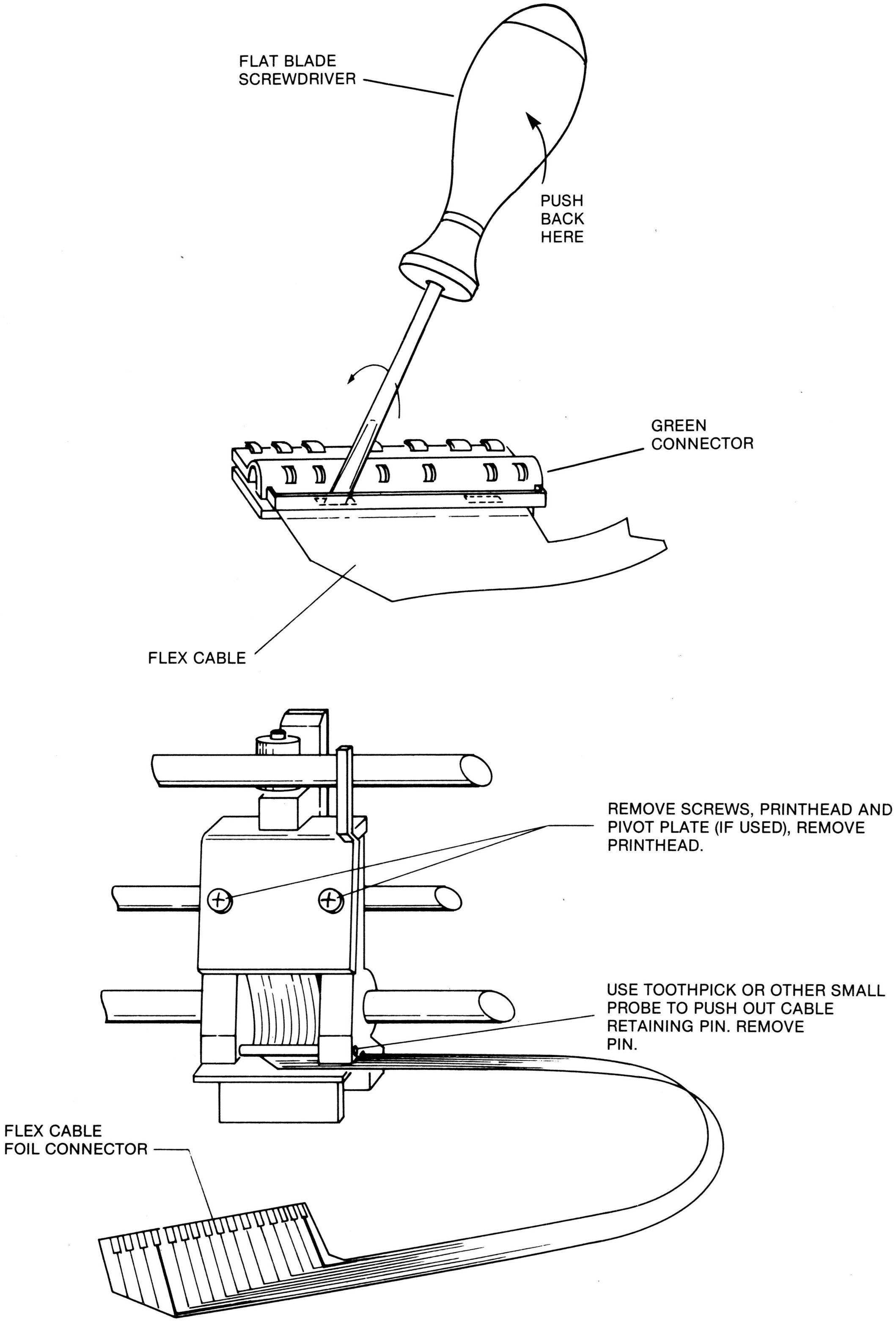

FLAT BLADE SCREWDRIVER
PUSH BACK HERE
GREEN CONNECTOR
FLEX CABLE
REMOVE SCREWS, PRINTHEAD AND PIVOT PLATE (IF USED), REMOVE PRINTHEAD.
USE TOOTHPICK OR OTHER SMALL PROBE TO PUSH OUT CABLE RETAINING PIN. REMOVE PIN.
FLEX CABLE FOIL CONNECTOR

Figure 5-11. Removing the Printhead.

NOTE

If the right screw will not tighten with the torque screwdriver, loosen the left screw an eighth of a turn and then tighten the right screw.

q. Repeat step o until the print quality is acceptable (dot darkness is even from side to side).

NOTE

If print quality is lighter or darker than desired, the printhead density should be adjusted for the correct level (see paragraph 5-15).

r. When the print quality is acceptable, seal both screws with screw locking fluid. Apply a small amount of damping grease to the head pressure bar pivot points (see paragraph 5-38C) if necessary.

5-32A. Video Display Adjustments.

5-32B. Remove the top housing in accordance with the instructions in paragraph 5-48 for access to the CRT Video Board Assembly controls and use the procedures in Figure 5-12 to make operational adjustments to the Video Display whenever minor brightness, contrast, linearity, centering, picture distortion or focus problems are noticed.

5-32C. Disk Drive Adjustments.

5-32D. The rear panel drive select switch (S1) on each Disk Drive must be set in accordance with where the Disk Drive is to be used (A position or B position). If the switch is not set to the correct position, information on the disk inserted into the drive will not load into the Computer. See Figure 5-13 for switch setting instructions.

5-33. PREVENTIVE MAINTENANCE.

5-34. The Computer should undergo inspection and cleaning operations at certain intervals either as part of a preventive maintenance program or, at a minimum, during any servicing procedure for the instrument. The program should also include an operating check and any required adjustment.

5-35. Inspection.

5-36. Inspect the instrument as follows (recommended for every service call).

a. Remove the top housing. Refer to paragraph 5-48 for instructions.

b. Check the interior of the instrument for loose hardware and evidence of electrical or mechanical deterioration or damage.

c. If present check the Printer Assembly drive belts for wear or damage and the drive mechanism for tightness.

VIDEO DISPLAY ADJUSTMENTS

A. These controls may be adjusted when required.

CONTROL	NAME	REFERENCE DESIGNATION AND LOCATION
Contrast	Contrast	Rear Panel
Brightness (External)	Brightness	Rear Panel
Brightness (Internal)	SUB BRIGHT	VR 602, CRT Video Board Assembly
Horizontal Hold	H-Hold	L601, CRT Video Board Assembly
Horizontal Video Center	Video Center	VR601, CRT Video Board Assembly
Vertical Hold	V-Hold	VR503, CRT Vidoe Board Assembly

B. These controls do not normally require adjustment

CONTROL	NAME	REFERENCE DESIGNATION AND LOCATION
Focus	Focus	VR603, CRT Video Board Assembly
Width	WIDTH	L603, CRT Video Board Assembly
Vertical Linearity	V-LIN	VR501, CRT Video Board Assembly
Height	HEIGHT	VR502, CRT Video Board Assembly
Centering	-	DY, Video Board Tube
Raster Collection	-	DY, Video Display Tube

C. INITIAL ADJUSTMENTS.

Apply power and test signals (use the monitor alignment pattern described in the disk diagnostics of Section VII) and check the display synchronization.

Brightness Adjustment

Set external brightness and contrast control to maximum and adjust sub-brightness control (VR602) for visual cutoff raster.

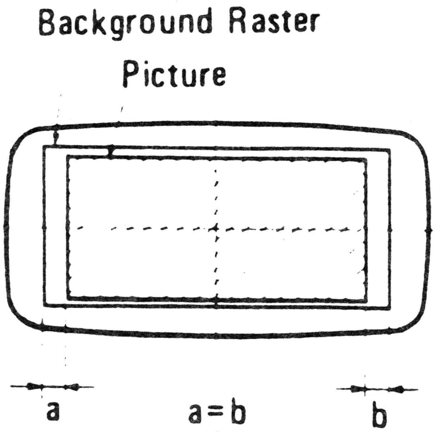
Contrast Adjustment

With brightness set to visual raster cutoff, adjust the contrast control to the point where defocusing disappers when the control is turned down from minimum.

NOTES:
DC INPUT VOLTAGE: Specified DC input voltage. (12±0.1V)
TEST SIGNAL: Specified signal input voltage and timing. Character should be displayed on the whole screen.
PICTURE SYNCHRONIZATION: Synchronize the picture with H-Hold (L601) for horizontal and V-Hold (VR503) for vertical.

D. ADJUSTMENT PROCEDURES: Perform the following adjustment procedures only when required. Refer to parts location diagram in Section VI for the points to be adjusted. After servicing, make sure all attaching hardware loosened during the adjustment procedures is tightened.

Figure 5-12. Video Display Adjustments (Sheet 1 of 5).

ITEM		SETTING VALUE	POINT TO BE ADJ.	ADJUSTMENT
D1	Horizontal Sync		H-HOLD Coil (L601)	Set H-Hold coil to the center of its synchronization range
D2	Horizontal Video Centering		VIDEO CENTER (VR601)	(1) Set External Brightness or sub-bright VR (VR602) to where background raster slightly appears. (2) Adjust Horizontal Video Center (VR601) to where the displayed picture is center of the background raster in horizontal. (Leave even space at left and right between each side of the background) (3) After Horizontal Video Center Adjustment, set Brightness (or Sub-brightness) to where the background raster disappears.
D3	Horizontal Width	190±5mm	WIDTH COIL(L603)	Obtain the specified value.
D4	Vertical Sync		V-HOLD VR (VR503)	Center of hold range
D5	Vertical Linearity		V-LIN VR(VR501)	(1) Adjust Vertical Height to obtain 2/3 to 3/4 of the specified value.
D6	Height	75±5mm	HEIGHT VR(502)	(2) Adjust V-LIN to obtain equal height of the monitor alignment pattern at top and bottom.

NOTE

The monitor alignment pattern may be displayed on the Video Monitor by selecting the proper pattern on the C/S Diagnostic disk.

Figure 5-12. Video Display Adjustments (Sheet 2 of 5).

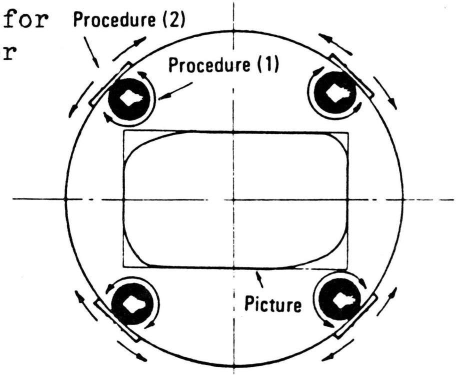
ITEM	SETTING VALUE	POINT TO BE ADJ.	ADJUSTMENT
D6 (Cont.)			(3) Adjust HEIGHT VR to obtain specified value.
D7 Contrast		CONTRAST VR(VR201)	Optimum point, but do not saturate the alignment pattern. (1) Set external brightness (BRT) to maximum.
D8 Brightness		SUB-BRIGHT VR (VR602)	(2) Set Sub-bright VR to where background raster disappears.
D9 Focus		FOCUS VR(VR603)	Adjust Focus VR to obtain overall focus. Make sure Brightness has been adjusted.
D10 Centering		CENTERING Magnets	(1) Place display area in the middle of the CRT. Leave even space at top and bottom, left and right between each side and edge of CRT. (2) Correct picture slant with DY by loosing the screw securing the DY.
D11 Picture (Raster) Distortion (for details refer to item D12)		MAGNETS ON DY	(1) Rotate each magnet to obtain optimum result. (2) If beyond control with magnets, move magnet assembly along circumference of DY slightly and repeat procedure (1).

Figure 5-12. Video Display Adjustments (Sheet 3 of 5).

D12 Adjustment Of Picture Distortions

The following explains how to adjust picture distortion using the deflection yoke equipped with the variable correction magnets. See Figure 1.
Note: The width, height and brightness should be adjusted in advance.

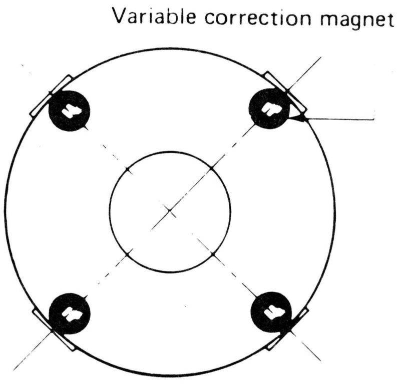


Fig. 1

a) Positioning Of Correction Magnets

Make the picture look like a circle as much as possible by turning the correction magnets and make the four distorted edges of the picture uniform at each magnet position. If the distorted edges are not uniform, change the positions of each magnet as shown in Figure 2

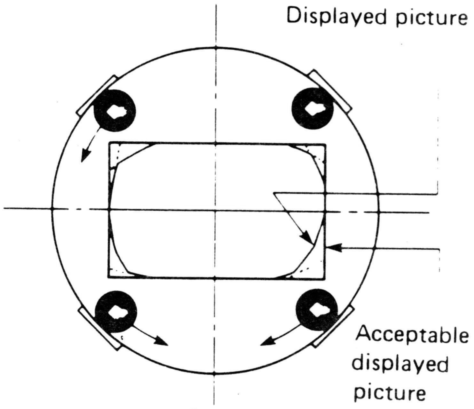


Fig. 2

b) Adjustment Of Correction Magnets

Gradually correct the distortion by turning the four correction magnets. Make sure that the horizontal center line remains horizontal and straight at all times during the adjustment.

c) Correction

If the distortions are not corrected by steps (a) and (b), turn the correction magnets while slightly changing the magnet positions.

Figure 5-12. Video Display Adjustments (Sheet 4 of 5).

(d) Technical Points On Adjustment

The following are the examples of final adjustments.

Example 1: Correction of Trapezodial Distortion

Keep the horizontal center line horizontal and straight. After making the shape of the distorted edges uniform by moving the correction magnets in the arrow-marked directions, stretch out the horizontal trapezodial distortion at point "a" by turning the correction magnet.
Perform the adjustment of the vertical trapezodial distortion at point "b" using the procedure above in Figure 3.

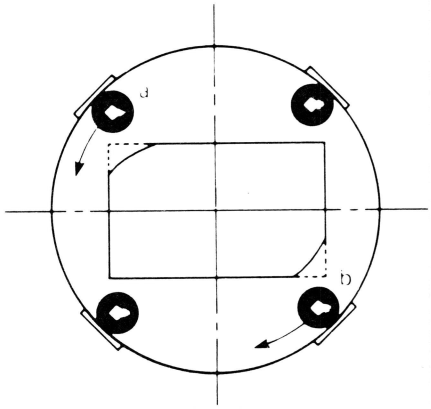


Fig. 3

Example 2: Correction of Pincushion and Circle Distortions
Since the pincushion (point a) and circle (point b) distortions are uniform at the edges, the distortions can be corrected by turning the correction magnets. See Figure 4.

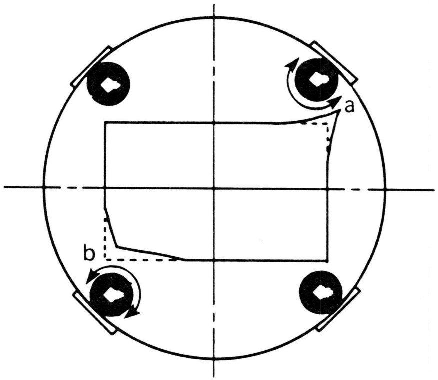


Fig. 4

Example 3: Correction of Compound Distortions
Make the distortion at edges (points a and b) of the picture uniform by moving the correction magnets in the arrow-marked directions. Then, correct the distortions by turning the magnets. See Figure 5.

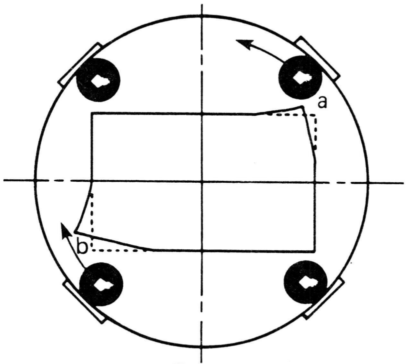
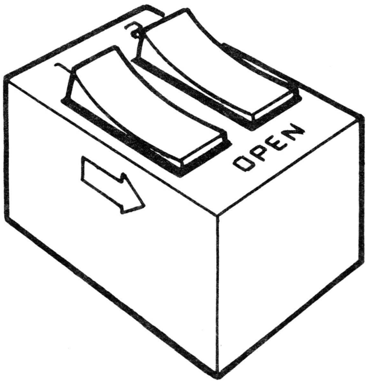
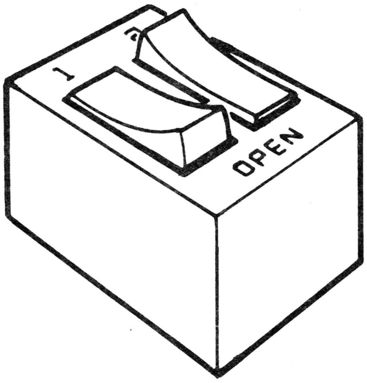


Fig. 5

Figure 5-12. Video Display Adjustments (Sheet 5 of 5).

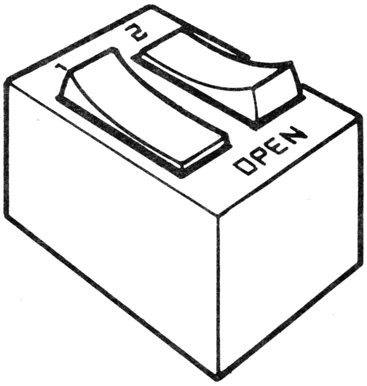


BOTH OPEN
NO DRIVES SELECTED



1 CLOSED
2 OPEN

DRIVE NO. 1 MUST BE SELECTED
FOR "A" DRIVE
POSITION



1 OPEN
2 CLOSED

DRIVE NO. 2 MUST BE SELECTED
FOR "B" DRIVE
POSITION (IF SUPPLIED).

Notes: 1. When only one Disk Drive is supplied with the Computer, set a replacement for the "A" drive position (switch element number 1 closed, switch element number 2 open).

2. If the Disk Drive(s) are already installed into the Computer, remove the top housing using the instructions of paragraph 5-48 and use an inspection mirror to check the position(s) of the rear panel switch(s).

Figure 5-13. Disk Drive Rear Panel Switch Setting.

d. Check the ac power cable and the internal interconnecting cables for damage.

e. Check that all circuit board assemblies are held in place with all hardware where required. Make sure that the Video Display tube is held firmly in position and the circuit board at the connector base of the tube is pressed securely onto the pins of the tube.

f. Make sure that the Disk Drives are secure.

g. Check that the plug in circuit boards are pressed down firmly into the proper I/O Mother Board Assembly connectors.

5-37. Cleaning.

5-38. Clean the Computer in accordance with the following steps (recommended every 12 months except for the printhead-clean after every roll of paper).

a. Wash the carrying case, if supplied, and the Computer Top Housing and Base Cabinet outside surfaces using a soft lint-free cloth, warm water and a mild dishwashing detergent. Dry the surfaces with a soft cloth.

CAUTION

DO NOT USE ALCOHOL, ACETONE, STRONG DETERGENT OR CHEMICALS AS CLEANING AGENTS FOR THE COMPUTER COVERS. STRONG CLEANERS MAY DAMAGE COVERS, KEYS OR PANEL MARKINGS.

b. Remove the Computer Top Housing if in place, and use a small brush and/or suction cleaner to remove the dirt and dust from the Printer Assembly drive mechanism, platen, and related drive parts.

c. Clean the carriage position and home sensors using a small cotton swab or compressed air.

d. Dampen a small cotton swab in isopropyl alcohol, slip it between the printhead and platen and carefully wipe the printhead clean.

NOTE

When the cleaning and inspection procedures are complete, perform the Operational Check of paragraph 5-7 to insure proper instrument operation.

5-38A. Disk Drive Head Cleaning.

5-38B. The read/write head of the Disk Drive can be cleaned by formatting a new disk. The head should be cleaned only when trouble occurs during a read or write operation, in other words, the head cleaning procedure should be used as a initial troubleshooting operation for the Disk Drive if trouble with the read or write operation occurs. After the formatting program is complete, the disk should be disposed of.

5-38C. Lubrication.

5-38D. Only the printhead carriage, the head pressure bar pivot points and the Solenoid linkage on the optional Printer Assembly require lubrication as follows.

a. Approximately every 12 months, place one or two drops of light machine oil (sewing machine oil) on a small clean lint-free tissue and wipe over the metal carriage shaft that the printhead carriage slides on.

CAUTION

ONLY A VERY LIGHT FILM OF OIL IS TO BE USED.

b. If damping grease is not evident on the two pivot pins where the head pressure bar is fastened to the Printer Assembly frame, apply a very small amount at these points (see Figure 6-9).

c. If damping grease is not evident on the Solenoid linkage on the Printer Assembly, apply a very small amount at the points of the linkage (see Figure 6-9).

5-39. TROUBLESHOOTING.

5-40. The troubleshooting procedures are to aid the service person in getting the Computer back into operation in the shortest possible time. The procedures suggest problem areas where a circuit board or a part can simply be unplugged and replaced without the need for understanding the circuit theory. To accomplish this, the troubleshooting information has been separated into Computer Quick Checks (paragraph 5-41), diagnostic procedures and error messages (Section VII), and a Troubleshooting Guide (Table 5-3). Note that the troubleshooting guide procedures do not show all the possible troubles but do demonstrate a logical approach for isolating a problem. If the trouble is isolated to any part or assembly, the item should be replaced and the Computer checked for proper operation using the instructions in paragraph 5-7 (Operational Checks). To isolate failures not covered in the troubleshooting procedures, use the appropriate circuit theory descriptions, the schematics and the block diagrams in Section IV and VI as aids for locating the source of trouble.

WARNING

WHEN REMOVING OR REPLACING CIRCUIT BOARDS OR COMPONENTS, MAKE SURE THAT THE POWER IS REMOVED FROM THE INSTRUMENT. ALWAYS DISCHARGE THE VIDEO DISPLAY TUBE HIGH VOLTAGE BEFORE PERFORMING ANY SERVICE OPERATIONS INSIDE OF THE INSTRUMENT (SEE FIGURE 5-1).

CAUTION

IF THE DRAM/ROM BOARD ASSEMBLY IS REMOVED FOR SERVICE, MAKE SURE THE CIRCUIT BOARD IS PLACED ON A NON-CONDUCTIVE SURFACE TO PREVENT SHORTING OUT THE BATTERY.

NOTE

Always perform the Terminal Quick Checks before performing any other troubleshooting operation. Also refer to the Operating Manuals for sources of possible operator error (inappropriate switch settings, pressing the wrong keys etc.)

5-41. Computer Quick Checks.

5-42. The following is a listing of the preliminary checkout and maintenance procedures that should be performed before starting any troubleshooting procedure.

a. Check the status of the Computer (configuration status and diagnostic error messages).

b. Clean the printhead with isopropyl alcohol if the Printer Assembly option is supplied.

c. Check and make sure that the keys and the switches of the Keyboard Assembly operate smoothly and do not bind.

d. Check that the battery back-up is operating (DRAM/ROM Board Assembly, see Figure 5-2).

e. If the problem is with the Disk Drive Read/Write operation, clean the head using the instructions in paragraph 5-38A.

f. Check the modem operation and the direct phone line (RJ-11) connection and operation if this option is supplied.

g. Check the RS-232-C operation if this option is supplied.

h. Check the Printer Assembly output quality for adequate darkness and complete symbols (letters and/or numbers) if this option is supplied.

NOTE

If the symbols are not completely formed, make resistance checks on the printhead (see paragraph 5-11).

i. Check the Video Display quality for adequate definition, focus, brightness and complete symbols.

j. Check the condition of the Computer line cord, the line cord connector and the line input connector (on the rear of the instrument).

TROUBLESHOOTING CHART

PROBLEM	POSSIBLE CAUSE	SOLUTION
1. Power Switch On, Fan does not operate, No display message, No Disk Drive light(s)	A) Power Source	A) Use another outlet
	B) Line Cord	B) Replace Line Cord
	C) Power Switch/ Circuit Breaker	C) Replace Power Switch/ Circuit Breaker
	D) Line Cord Receptacle Receptacle.	D) Replace Line Cord
2. Power Switch On, Fan operating, no display message, no Disk Drive lights	A) Power Supply malfunction	A) Replace Rear Power Supply
	B) Bad DRAM/ROM Board Assembly	B) Replace DRAM/ROM Board Assembly
3. Rear Fan does not operate. Display message present, Disk Drive lights go on.	A) Bad Fan	A) Replace Fan
4. Noisy Fan. Display message present. Disk Drive lights go on	A) Check Rear Fan	A) Replace Fan
	B) Check Internal Fan	B) Replace Fan
5. Over Heats (usually indicated by disk loading problems)	A) Check Rear Fan	A) Replace Fan
	B) Check Internal Fan	B) Replace Fan
	C) Air Cooling Vents blocked	C) Clear vents
6. Computer intermittently turns on	A) Line Cord	A) Replace Line Cord
	B) Line Cord Receptacle receptacle	B) Replace Line Cord
	C) Power Supply malfunction	C) Replace Power Supply Assembly
	D) Power Switch/ Circuit Breaker	D) Replace Power Switch/ Circuit Breaker
7. Power Switch turned off, but Computer stays on	A) Power Switch/ Circuit Breaker	A) Replace Power Switch Circuit Breaker
8. At power up, video display is filled with exclamation marks (!)	A) Bad CRT Controller Board Assembly	A) Replace CRT Controller Board Assembly

Table 5-3. Troubleshooting Guide (Sheet 1 of 7).

TROUBLESHOOTING CHART (Con't)

	PROBLEM	POSSIBLE CAUSE	SOLUTION
9.	No response from Keyboard Assembly	A) Bad Keyboard Assembly B) Broken Keyboard Assembly Cable C) Broken pin in Keyboard Assembly cable plug D) Bad CRT Controller Board Assembly E) Bad I/O Mother Board Assembly	A) Replace Keyboard Assembly B) Replace Keyboard Assembly C) Replace Keyboard Assembly D) Replace CRT Controller Board Assembly E) Replace Mother Board Assembly
10.	Does not show individual character on Video Display or print individual characters on the Printer Assembly (if supplied)	A) Bad Key pad	A) Replace Keyboard Assembly
11.	Shows wrong Characters on Video Display and on Printer Assembly (if supplied)	A) Bad Keyboard Assembly	A) Replace Keyboard Assembly
12.	Unable to print characters on Video Display	A) Bad key pads B) Bad CRT Controller Board Assembly	A) Replace Keyboard B) Replace CRT Controller Board Assembly
13.	Unable to show characters on Video Display but prompt moves when print mode is entered	A) Bad key pads B) Bad CRT Controller Board Assembly	A) Replace Keyboard Assembly B) Replace CRT Controller Board Assembly

Table 5-3. Troubleshooting Guide (Sheet 2 of 7).

TROUBLESHOOTING CHART (Con't)

	PROBLEM	POSSIBLE CAUSE	SOLUTION
14.	Every other Character is wrong on Video Display	A) Bad key pads B) Bad CRT Controller Board Assembly	A) Replace Keyboard Assembly B) Replace CRT Controller Board Assembly
15.	Stray markings and/or characters present over Video Display	A) Bad CRT Controller Board Assembly	A) Replace CRT Controller Board Assembly
16.	Flashing Video Display	A) Bad CRT Controller Board Assembly	A) Replace CRT Controller Board Assembly
17.	Snow on Video Display	A) Bad CRT Controller Board Assembly	A) Replace CRT Controller Board Assembly
18.	Split image on Video Display	A) Bad CRT Controller Board Assembly	A) Replace CRT Controller Board Assembly
19.	Double image on Video Display	A) Bad CRT Controller Board Assembly	A) Replace CRT Controller Board Assembly
20.	Video Display Dark	A) Brightness control needs adjustment B) Contrast control needs adjustment C) Sub bright Control needs adjustment D) Bad CRT Video Board Assembly	A) Adjust the rear panel brightness control B) Adjust the rear panel contrast control C) Adjust Sub-brightness control B) Replace CRT Video Board Assembly
21.	Video Display out of focus	A) Focus needs adjustment	A) Adjust Focus control
22.	Video Display rolls	A) Vertical Hold needs Adjustment	A) Adjust Vertical Hold Control

Table 5-3. Troubleshooting Guide (Sheet 3 of 7).

TROUBLESHOOTING GUIDE (Con't)

	PROBLEM	POSSIBLE CAUSE	SOLUTION
23.	Video Display pulls to one side	A) Horizontal Control needs adjustment	A) Adjust Horizontal Hold control
24.	Nothing on Video Display (No Picture)	A) Bad Power Supply Assembly	A) Replace Power Supply Assembly
		B) Bad CRT Controller Board Assembly	B) Replace CRT Controller Board Assembly
		C) Bad CRT Video Board Assembly	C) Replace Video Board Assembly
		D) Bad Video Display Tube	D) Replace Video Display Tube
25.	Characters on Video Display but unable to print on Printer Assembly (if supplied)	A) Bad printhead	A) Replace printhead
		B) Bad print logic	B) Replace Printer Assembly
26.	Printhead moves but does not print	A) Bad printhead	A) Replace printhead
		B) Bad print logic	B) Replace Printer Assembly
		C) Bad Mother Board Assembly	C) Replace Mother Board Assembly
		D) Bad Interconnecting Cable	D) Replace Interconnecting Cable
		E) Bad Power Supply Assembly	E) Replace Power Supply Assembly
27.	Missing dots on printout from Printer Assembly	A) Bad printhead	A) Replace printhead
		B) Bad Printer Assembly	B) Replace Printer Assembly
28.	Printing wrong characters on Printer Assembly	A) Bad print logic	A) Replace Printer Assembly
29.	No line feed on Printer Assembly	A) Bad print logic	A) Replace Printer Assembly

Table 5-3. Troubleshooting Guide (Sheet 4 of 7).

TROUBLESHOOTING GUIDE (Con't)

	PROBLEM	POSSIBLE CAUSE	SOLUTION
30.	Slow return on Printer Assembly	A) Bad Printer Assembly	A) Replace Printer Assembly
31.	Paper skewing on Printer Assembly	A) Bad Printer Assembly	A) Replace Printer Assembly
32.	Printout is light or dark on return line Printer Assembly prints from right to left)	A) Bad Printer Assembly	A) Replace Printer Assembly
33.	Noisy Printer Assembly	A) Bad Printer Assembly	A) Replace Printer Assembly
34.	Printer Assembly total lockup	A) Bad Printer Assembly	A) Replace Printer Assembly
35.	Disk will not format	A) Bad disk B) Bad Disk Drive C) Bad I/O Mother Board Assembly	A) Try new disks B) Replace Disk Drive C) Replace I/O Mother Board Assembly
36.	Disk can not be copied	A) Bad disk B) Bad Disk Drive C) Bad I/O Mother Board Assembly	A) Replace disk B) Replace Disk Drive C) Replace I/O Mother Board Assembly
37.	Computer will not load operating system	A) Bad disk B) Bad Disk Drive C) Bad I/O Mother Board Assembly	A) Replace disk B) Replace Disk Drive C) Replace I/O Mother Board Assembly
38.	Disk Drive motor does not rotate	A) Bad Disk Drive	A) Replace Disk Drive
39.	Disk Drive indicator does not light	A) Bad Disk Drive	A) Replace Disk Drive
40.	Disk Drive Motor Speed incorrect	A) Bad Disk Drive	A) Replace Disk Drive
41.	Disk Drive Tracking error	A) Bad Disk Drive	A) Replace Disk Drive

Table 5-3. Troubleshooting Guide (Sheet 5 of 7).

TROUBLESHOOTING CHART (Con't)

	PROBLEM	POSSIBLE CAUSE	SOLUTION
42.	Disk Interchange between disk drives causes error code to appear	A) Bad disk B) Bad Disk Drive	A) Replace disk B) Replace Disk Drive
43.	Disk Drive motor rotates without a disk installed	A) Bad Disk Drive	A) Replace Disk Drive
44.	Computer Video Display shows wrong characters from memory	A) Bad DRAM/ROM Board Assembly	A) Replace DRAM/ROM Board Assembly
45.	Bad RAM causing Errors on Video Display	A) Bad DRAM/ROM Board Assembly	A) Replace DRAM/ROM Board Assembly
46.	No communications on RS-232 Ports 1 and 2	A) Bad I/O Mother Board Assembly	A) Replace I/O Mother Board Assembly
47.	No response from entire Computer System. Unable to send print command to printer. Unable to load operating system from disk	A) Bad Power Supply B) Bad DRAM/ROM Board Assembly C) Bad CRT Controller Board Assembly D) Bad I/O Mother Board Assembly	A) Replace Power Supply B) Replace DRAM/ROM Board Assembly C) Replace CRT Controller Board Assembly D) Replace I/O Mother Board Assembly
48.	Computer System hung up. After power reset problem goes away but reappears later	A) Bad I/O Mother Board Assembly	A) Replace I/O Mother Board or power down,
49.	Incorrect date and/or time (After initial setting) Computer does not display proper date and time	A) Battery on DRAM/ROM Board Assembly B) DRAM/ROM Board Assembly	A) Check Battery (2.8VDC - 10%) B) Replace DRAM/ROM Board Assembly

Table 5-3. Troubleshooting Guide (Sheet 6 of 7).

TROUBLESHOOTING CHART (Con't)

	PROBLEM	POSSIBLE CAUSE	SOLUTION
50.	Start up diagnostics OK but disk diagnostics do not operate properly	A) Bad disk B) Bad Disk Drive C) Bad DRAM/ROM Board Assembly	A) Substitute back up disk B) Check Disk Drive, replace C) Replace DRAM/ROM Board Assembly
51.	Turn on power but Computer Video Display remains blank (screen does not light up)	A) Failure in first 16K of dynamic RAM B) Bad CRT Video Board Assembly C) Bad Video Display Tube (CRT)	A) Replace DRAM/RAM Board Assembly B) Replace CRT Video Board Assembly C) Replace Video Display Tube

Table 5-3. Troubleshooting Guide (Sheet 7 of 7).

k. Check the power switch/circuit breaker (rear panel).

l. If extender test cables and/or extender cards are available, some test measurements can be made, if applicable to the problem, using the connector pinout information in Table 8-3. Bus connector data is also included as an aid in defining the Computer signal lines. Continuity of the Computer interconnecting cables can be checked with the VOM using the cable diagrams of Figure 6-15 as a guide if a problem in this area is suspected. When the optional Printer Assembly is supplied, the Power Supply output voltages can be checked by disconnecting the cable between the Power Supply Assembly and the Printer Assembly at the Printer Control Board and measuring the voltages at the connector pins (see Table 8-3).

5-43. DISASSEMBLY, REPAIR AND ASSEMBLY

5-44. Assemblies of the Computer are identified by reference designations and part numbers listed in Section VI. Illustrations showing the replaceable parts and assemblies and the locations of these items are also included in Section VI. Refer to these illustrations when performing the following procedures.

5-45. Always perform the applicable adjustment if necessary (paragraph 5-13) and the operational checks (paragraph 5-7) after replacing a part or an assembly.

CAUTION

HANDLE A CIRCUIT BOARD BY THE EDGES. ANY CONTAMINATION (OIL, DIRT, DUST, WATER) OR ELECTROSTATIC DISCHARGE CAN CAUSE REDUCED CIRCUIT PERFORMANCE OR DAMAGE TO SENSITIVE COMPONENTS. ALSO BE CAREFUL WHEN PLACING THE DRAM/ROM BOARD ASSEMBLY ON ANY SURFACE. THE MEMORY BATTERY SUPPLY CAN BE DAMAGED BY CONTACTING A CONDUCTIVE SURFACE.

WARNING

DISCONNECT THE AC LINE CORD FROM THE AC POWER SOURCE OR THE INSTRUMENT AND DISCHARGE THE HIGH VOLTAGE SUPPLY TO THE VIDEO DISPLAY TUBE (SEE FIGURE 5-1) BEFORE PERFORMING ANY DISASSEMBLY PROCEDURES ON THE TERMINAL.

5-46. Disassembly Procedures.

5-47. The following procedures describe the recommended method for removing assemblies and parts from the Computer. See the drawings in Section VI for aid during the disassembly operations.

5-48. INITIAL DISASSEMBLY (TOP HOUSING REMOVAL). Perform the following steps to remove the Top Housing Assembly from the Computer.

a. If the Carrying Case Assembly is still in place, open the front cap and release the four case latches, then lift the case cover from the instrument (see Figure 6-1).

b. Remove the four phillips head screws from the back of the Top Housing Assembly (A3) of the instrument.

c. Slide the Top Housing Assembly cover towards the rear of the instrument and lift from the base.

5-49. The following paragraphs describe how to remove the main assemblies and major parts from the Computer. If only the printhead assembly is to be removed for replacement purposes, use the instructions in paragraph 5-31 (Printhead Replacement and Adjustment).

WARNING

DISCHARGE THE VIDEO DISPLAY TUBE HIGH VOLTAGE POWER SUPPLY. SEE FIGURE 5-1.

5-50. Except for the I/O Mother Board Assembly, the Front Panel Assembly and Video Display tube, the CRT Video Board Assembly and the Modem Assembly, all main assemblies and major parts can be removed directly from the Computer by disconnecting cables and removing hardware.

5-51. REMOVING THE KEYBOARD ASSEMBLY (A2). Use the following steps to remove the Keyboard Assembly from the Keyboard Housing Assembly.

a. Open the front cap and release the four Carrying Case Assembly latches. Then remove and turn the Carrying Case Assembly over and remove the Keyboard Assembly from the cover. If the Carrying Case is not on the instrument, unplug the Keyboard Assembly from the rear of the Computer.

b. Turn the Keyboard Assembly over onto a padded surface.

c. Remove the four screws from the bottom of the cover and remove the bottom cover.

d. Remove the two screws and flat washers holding the Keyboard to the top cover and lift the Keyboard out of the cover.

5-52. DRAM/ROM BOARD ASSEMBLY (A5) REMOVAL. Perform the following steps to remove the DRAM/ROM Board Assembly from the Computer.

a. Perform the steps of paragraph 5-48.

b. Carefully lift the DRAM/ROM Board Assembly circuit board from the I/O Mother Board Assembly connector.

5-53. CRT CONTROLLER BOARD ASSEMBLY (A6) REMOVAL. Perform the following steps to remove the CRT Controller Board Assembly from the Computer.

a. Perform the steps of paragraph 5-48.

b. Carefully lift the CRT Controller Board Assembly circuit board from the I/O Mother Board Assembly Connector.

5-54. REMOVING THE PRINTER ASSEMBLY (A7). Remove the Printer Assembly using the following steps.

a. Perform the steps of paragraph 5-48 and remove the paper roll from the Printer Assembly if present.

b. Remove the four hex nuts and three special washers (Figure 6-2) holding the Printer Assembly to the shock mounts on the Base Cabinet Assembly.

c. Disconnect cable connectors at the Printer Control Board jacks J1 (10 pins) (left side to the Power Supply Assembly) and J2 (5 pins) (rear of the circuit board to the I/O Mother Board Assembly).

NOTE

Lift the Printer Assembly up slightly on the left side to disconnect the cable to jack J1.

d. Carefully lift the Printer Assembly up off the four mounts.

5-55. PRINTER CONTROL BOARD (A7A1) REMOVAL. Perform the following steps to remove the Printer Control Board.

a. Perform the steps of paragraph 5-54.

b. Place the Printer Assembly on a padded surface.

c. Disconnect the printhead flex cable from connector J3 on the circuit board by using a small screw driver to pop open the connector (See Figure 5-11) at the front of the board.

d. Disconnect the cable connector at connector J4 on the circuit board (right side of the circuit board that goes to the mechanical printer). Remove the four attaching screws, nylon washers, phenolic spacers and lock nuts holding the Printer Control Board in place and remove the circuit board.

5-56. PLOTTING PRINTER ASSEMBLY (A7A2) REMOVAL. Use the following procedure to remove the Plotting Printer Assembly (A7A2).

a. Perform the steps of paragraph 5-55.

5-57. POWER SUPPLY ASSEMBLY (A8) REMOVAL. Remove the Power Supply Assembly using the following steps.

a. Perform the steps of paragraph 5-54.

b. Remove the screw, lock washer and flat washers that hold the assembly against the Fan/Ac Bracket Assembly at the top left corner of the circuit board. Remove the screw and locking hex nut that holds the Power Supply Assembly to the Front Panel Assembly bracket.

c. Disconnect the cable plug from jack J4 (7 pins) on the circuit board (cable connects to the Fan/AC Bracket Assembly). Pull the Power Supply Assembly slightly up and away from the instrument and disconnect the cable to the I/O Mother Board Assembly jack J1.

d. Remove the Power Supply Assembly.

5-58. DISK DRIVE NO. 1 (A11) REMOVAL. Perform the following steps to remove Disk Drive No. 1. (A Drive).

a. Perform the steps of paragraph 5-54.

b. Remove the two screws and washers holding the Disk Drive in place (Figure 6-2) and push the Drive forward slightly.

NOTE

Disk Drive A must be pushed forward slightly to remove the ribbon cable connector from the rear jack of the drive or to unlock and remove the opposite ribbon cable connector from the I/O Mother Board jack.

c. Unplug the power and signal connectors from rear of the Disk Drive.

5-59. DISK DRIVE NO. 2 (A12) REMOVAL. Repeat the procedure outlined in paragraph 5-58 to remove Disk Drive No. 2 (B Drive) if supplied.

5-60. REMOVING THE FRONT PANEL ASSEMBLY (A4). Use the following steps to remove the Front Panel Assembly.

a. Repeat the steps of paragraphs 5-52 and 5-53 to remove the DRAM/ROM Board Assembly and the CRT Controller Board Assembly.

b. Remove the Printer Assembly using the steps of paragraph 5-54.

c. Remove the Power Supply Assembly using the applicable steps of paragraph 5-57.

d. Disconnect the ground wire connector (black insulated wire) from the ground pin on the circuit board at the base of the Video Display tube.

e. Disconnect (pull off carefully) the circuit board at the base of the Video Display Tube.

f. Using the special 1/4 inch nut driver with the extension handle, remove the six hex head screws at the front of the instrument that holds the Front Panel Assembly to the Base Cabinet Assembly.

g. Carefully pull the Front Panel Assembly forward slightly and disconnect the anode lead from the side of the Video Display tube.

WARNING

MAKE SURE THAT THE HIGH VOLTAGE SUPPLY IS DISCHARGED BEFORE DISCONNECTING THE ANODE LEAD, SEE FIGURE 5-1 FOR INSTRUCTIONS.

h. Remove the connector (red and blue wires) from jack J602 on the CRT Video Board Assembly.

i. Remove the connector (green and yellow wires) from the VERT jack on the CRT Video Board Assembly.

j. Disconnect the Disk Drive power connector from the I/O Mother Board Assembly jack J15 and the Disk Drive signal connector from I/O Mother Board jack J13.

k. Carefully pull the Front Panel Assembly forward until the I/O Mother Board Assembly connectors for the cooling fan and the speaker are exposed. Disconnect these two cables.

l. Remove the Front Panel Assembly from the instrument.

NOTE

To remove the Video Display filter, loosen the screw at each corner of the bracket holding the Video Display tube to the front panel and remove the filter from the front panel.

5-61. FAN/AC BRACKET ASSEMBLY (A9A1) REMOVAL. Perform the following steps to remove the Fan/AC Bracket Assembly.

a. Perform steps of paragraph 5-54 and remove the Printer Assembly.

b. Perform the applicable steps of paragraph 5-57 and remove the Power Supply Assembly.

c. Remove the three hex head screws at the base of the Fan/AC Bracket Assembly and remove the assembly.

5-62. CRT VIDEO BOARD ASSEMBLY (A10) REMOVAL. Remove the CRT Video Board Assembly using the following procedure.

a. Remove the Front Panel Assembly using the instructions in paragraph 5-60.

b. Remove the circuit board edge connector from the rear edge of the CRT Video Board Assembly or disconnect the cable connector at J16 on the I/O Mother Board Assembly.

c. Remove the four screws holding the CRT Video Board Assembly in place and remove the circuit board.

5-63. I/O MOTHER BOARD AND REAR PANEL ASSEMBLY (A9A2) REMOVAL. Remove the I/O Mother Board and Rear Panel Assembly by using the following procedure.

NOTE

Parts of the I/O Mother Board Assembly and the Rear Panel Assembly are soldered together, therefore the assembly must be removed and replaced as a single unit.

a. Remove the Front Panel Assembly, refer to paragraph 5-60 for instructions.

b. Disconnect the cable connector to jack J16 on the I/O Mother Board Assembly.

c. Remove the eight screws holding the I/O Mother Board Assembly/Rear Panel Assembly in place and remove the circuit board.

5-64. Repair Procedures.

5-65. Repair procedures consist of replacement of malfunctioning circuit boards and the plug in parts thereof, the Printer Assembly printhead, stepping motors and drive belts or the complete assembly; and the Keyboard Assembly and the Keyboard cable and connector assembly. In addition, the cooling fan, the reset switch, the ac power input circuit parts, the Floppy Fan and Speaker Assembly parts, the interconnecting cable assemblies and the Video Display Tube can be replaced. Use the diagrams in Section VI for aid in the replacement operations. All replaceable parts and assemblies for the instrument are listed in Section VI.

CAUTION

SOME PARTS USED IN THE COMPUTER ARE SENSITIVE TO ELECTROSTATIC DISCHARGES. BE CAREFUL WHEN REPLACING THE PLUG-IN INTEGRATED CIRCUITS AND THIN FILM PRECISION RESISTORS.

5-66. REPLACING PRINTER ASSEMBLY (A7) PARTS. Refer to Figure 6-9 for aid in replacing parts on the Printer Assembly.

5-67. REPLACING FAN/AC BRACKET (A9A1) PARTS. Refer to Figure 6-11 for aid in replacing parts of the Fan/AC Bracket.

5-68. REPLACING THE VIDEO DISPLAY TUBE (V1). Replace the Video Display Tube in accordance with Figure 6-4.

5-69. REPLACING THE FLOPPY FAN AND SPEAKER ASSEMBLY (A4A1) PARTS. Refer to Figure 6-4 for aid in replacing the floppy fan or the speaker.

5-70. REPLACING THE POWER SUPPLY MAIN BOARD ASSEMBLY (A8A1) OR PIGGYBACK ASSEMBLY (A8A1A1). Use Figure 6-10 for aid in replacing the Main Board Assembly or the Piggyback Assembly.

5-71. Assembly Procedures.

5-72. Assembly of the Computer is essentially the reverse of the disassembly procedures outlined in the previous paragraphs. During the assembly operations make sure that all connectors are correctly installed and secure, and that the Keyboard Assembly top panel is aligned properly so that key operation is not blocked by the panel edges. In addition, make sure that the printhead flexible cable connector edge is inserted into the connector as much as possible and that the exposed foil leads face up before closing the connector. Also make sure that the hardware is torqued in accordance with Table 5-2 where necessary. Note that the rear switch(s) on the Disk Drives(s) must be set in accordance with Figure 5-13 for proper Computer operation. Also, if parts of the Printer Assembly are replaced or the Video Display Tube is replaced, refer to the adjustment procedures in paragraph 5-13 and Figure 5-12 respectively for any necessary adjustments. After assembly procedures are complete, perform the applicable checks as outlined in the INITIAL CHECKOUT paragraph (5-5).

CAUTION

PIN 1 AND/OR WIRE 1 OF THE RIBBON CABLES ARE MARKED WITH A RED MARK OR TRACE. THE CONNECTORS ARE NOT KEYED SO MAKE SURE THAT THE CONNECTORS ARE MATED PROPERLY WHEN INSTALLING THE CABLES. IN ADDITION MAKE SURE THAT THE CABLE CONNECTORS FROM THE POWER SUPPLY ARE MATED CORRECTLY AND SECURELY WITH THE RESPECTIVE CONNECTORS ON THE CIRCUIT BOARDS. IMPROPER CONNECTIONS WILL CAUSE CIRCUIT COMPONENTS TO BE DAMAGED.

SECTION VI

REPLACEABLE PARTS AND CIRCUIT DIAGRAMS

6-1. INTRODUCTION.

6-2. This section includes the replaceable parts list, assembly parts lists, location diagrams and schematics for identifying, locating and ordering replacement parts for the Computer.

6-3. All parts and assemblies recommended for replacement are listed in Table 6-1. The listing includes the index number or reference designation, the part name and the Computer Devices Inc. part number. Attaching parts (screws, nuts, washers) used to secure the parts are listed on the same list with the parts only if not common hardware.

6-4. Some of the assembly parts lists in this section may include a USE ON CODE column. This column is added for assemblies that are similar in construction and include many of the same parts, and where one assembly may be substituted for another depending upon how an instrument is to be used and what options have been included. Table 6-2 lists these "Use on Code" definitions for the Computer assemblies which describes where the circuit board variations are used.

6-5. Table 6-3 list the detail parts for all the assemblies that are used in the Computer. Replacement of these parts is normally done at the Computer Devices Inc., Customer Service Repair Depot.

6-6. USING THE PARTS LIST.

6-7. The parts list (Table 6-1) lists the main replaceable assemblies and parts of the Computer. If the assembly listed is one that is selected at the time that the instrument is ordered, all possible variations of that assembly are listed in the sequence. For example, the DRAM/ROM Board Assembly (CPU Board Assembly A5A1) can be obtained in different versions. These are listed under reference designation A5. The DRAM/ROM Board Assembly to be replaced can be identified by using the part number on the board, the Use on Code definitions of Table 6-2, the configuration guide of Figure 6-16 and the illustrations of Figure 6-5. Then the proper replacement can be selected from Table 6-1. In the case of an optional assembly, the reference designation includes an "O" (for option) but is listed in the same manner and the identification of the replacement optional assembly is done using the same method as described for the DRAM/ROM Board Assembly. To locate the component parts for each of the assemblies, locate the applicable figure reference in the DESCRIPTION/FIGURE NO. column of the parts list table (6-1). Then refer to the Detailed Parts List (Table 6-3) and locate the figure reference at the middle or bottom of the page. The parts listed directly with the same figure references are the parts of the assembly.

6-8. Also note that subassemblies listed with the same reference designation number as the main assembly above it are included as part of the main assembly when the main assembly part number is ordered from Computer Devices Inc. In other words if the Power Supply Main Board Assembly (A8A1) is ordered, the Power Supply Piggyback Assembly (A8A1A1) is also included on the Main Board Assembly.

6-9. ORDERING INFORMATION.

6-10. To order a replacement part, send an order or inquiry to:

Computer Devices Inc.
ATTN: Repair Parts Department
25 North Avenue
Burlington MA. 01803

Include the following information with the order:

a. Model number and serial number of the instrument that the part is used in. Include all digits from the label at the rear of the Computer (see paragraph 1-6).

b. The item name, reference designation, and part number from the parts list (Table 6-1).

REFERENCE DESIGNATION	DESCRIPTION/FIGURE NUMBER	PART NUMBER	USE ON CODE
A1	Carrying Case Assembly/6-1	0002-14627	
A1A1	Carrying Case/6-1	0002-14553	
A2	Keyboard Assembly/6-2	0002-14562	
A2A1	Keyboard/6-3	0002-14585	
A3	Top Housing Assembly/6-1	0002-14550	
A3A1	Cabinet Door Assembly/6-1	0002-14599	
A4	Front Panel Assembly/6-4	0002-14549	
A4A1	Floppy Fan And Speaker Assembly/6-2	0002-14571	
A5	DRAM/ROM Board Assembly (8088)/6-5	0002-14502	
A5A1	CPU Board Assembly/6-5		
	CPU Board Assembly	0002-14502-00	A
	CPU Board Assembly	0002-14502-01	B
	CPU Board Assembly	0002-14502-02	C
	CPU Board Assembly	0002-14502-03	D
A6	CRT Controller Board Assembly 6-6	0002-14504	
A7	Printer Assembly (Optional) 6-7	0002-14552	
A7A1	Printer Control Board/6-8	0002-14505	
A7A2	Plotting Printer Assembly (Mechanical)	0002-06645	
A8	Power Supply Assembly/6-10	0002-14561	
A8A1	Power Supply Main Board Assembly	0002-14506	
A8A1A1	Power Supply Piggyback Assembly	0002-14507	

Table 6-1. Replacement Parts List (Sheet 1 of 3).

REFERENCE DESIGNATION	DESCRIPTION/FIGURE NUMBER	PART NUMBER	USE ON CODE
A9	Base Cabinet Assembly/6-2	0002-14548	
	Base Cabinet Assembly	0002-14548-00	E
	Base Cabinet Assembly	0002-14548-01	F
	Base Cabinet Assembly	0002-14548-02	G
	Base Cabinet Assembly	0002-14548-03	H
A9A1	Fan/AC Bracket Assembly 6-11	0002-14551	
A9A2	Rear Panel Assembly/6-12	0002-14597	
	Rear Panel Assembly	0002-14597-00	E
	Rear Panel Assembly	0002-14597-01	F
	Rear Panel Assembly	0002-14597-02	G
	Rear Panel Assembly	0002-14597-03	H
A9A2A1	I/O Mother Board Assembly 6-12	0002-14503	
	I/O Mother Board Assembly	0002-14503-00	E
	I/O Mother Board Assembly	0002-14503-01	F
	I/O Mother Board Assembly	0002-14503-02	G
	I/O Mother Board Assembly	0002-14503-03	H
A9A2A2	RJ-11 Input Assembly/6-12	0002-14577	
A10	CRT Video Board Assembly (includes Video Display Tube)	0628-00003	
A11	Disk Drive (Left) A/6-14	0002-14742	
A12	Disk Drive (Right) B (Optional)/6-14	0002-14742	See Figure 1-2 3000 B,C,D,E

Table 6-1. Replacement Parts List (Sheet 2 of 3).

REFERENCE DESIGNATION	DESCRIPTION/FIGURE NUMBER	PART NUMBER	USE ON CODE
W1	Cable Assembly, CRT Board Assy to I/O Mother Board Assy./6-15	0002-14555	
W2	Cable Assembly, Printer Assy to I/O Mother Board Assy (Optional), 6-15	0002-14556	See Figure 1-2 3000C,E
W3	Cable Assembly, Power Supply Assy. to I/O Mother Board Assy./6-15	0002-14557	
W4	Cable Assembly, Disk Drive to I/O Mother Board Assy. 6-15	0002-14558	
W5	Cable Assembly, Disk Drive to I/O Mother Board Assy. (Signal)/6-15	0002-14559	
W6	Cable Assembly Printer Assembly to Power Supply Assembly (Optional)/6-15	0002-14568	See Figure 1-2 3000C,E
	Diagnostic Disk for Field Service Use	0002-14732-21	

Table 6-1. Replacement Parts List (Sheet 3 of 3).

USE ON CODE DEFINITIONS:

CODE LETTER	USED WITH MODEL NUMBER	INSTRUMENT OPTION NUMBER IF APPLICABLE	DESCRIPTION OF APPLICATION OR VARIATION
A	3000 A,B,C or D		64K Memory Board
B	3000 A,B,C, or D		128K Memory Board
C	3000 A,B,C or D		192K Memory Board
D	3000, A,B,C or D		256K Memory Board
E	3000 A,B,C or D		BASIC Circuitry Instrument
F	3000 B,C or D		Addition of Z80
G	3000 B,C, or D		Addition of RS-232-C Ports (2), No Z80
H	3000 B,C or D		Addition of Z80 and RS-232-C Ports (2).

Table 6-2. Use on Code Definitions.

VARIABLE LIST OF MATERIALS

COMPUTER DEVICES INC. BURLINGTON MASSACHUSETTS

TITLE: ASSY, PCB,CPU/RAM

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DWG. NO. A 0002 - 14502

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EM O	PART NUMBER	DESCRIPTION	QUANTITY 14502-01 (128K)	14502-02(192K)	14502-03(256K)	REF DES.
1	A0002-14502-00	ASSY, PCB CPU (64K)	1	1	1	
2	0486-00080-T	HM4864-3 64 x 1 RAM	1	1	1	Z2
			-	1	1	Z3
			-	-	1	Z4
			1	1	1	Z9
			-	1	1	Z10
			-	-	1	Z11
			1	1	1	Z14
			-	1	1	Z15
			-	-	1	Z16
			1	1	1	Z22
			-	1	1	Z23
			-	-	1	Z24
			1	1	1	Z28
			-	1	1	Z29
			-	-	1	Z30
			1	1	1	Z34
			-	1	1	Z35
			-	-	1	Z36
			1	1	1	Z41
			-	1	1	Z42
			-	-	1	Z43
			1	1	1	Z47
			-	1	1	Z48
	0486-00080 -T	HM4864-3 64 x 1 RAM	-	-	1	Z49

See Figure 6-1, Sheets 1,3,4,5,6 and 7 for Component Locations.

LIST OF MATERIALS

COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS

TITLE: PORTABLE CARRYING CASE,3000

REF. ASS'Y: D0010-14553

DRAWING NUMBER A 0002 – 14553

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NO.	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1	D	0001 - 14563	1	1	COVER - 3000 CARRYING CASE
2	D	0001 - 14564	1	2	CAP - 3000 CARRYING CASE
3	D	0001 - 14566	1	3	KEYBOARD LATCH PLATE - 3000 CARRYING CASE
4	C	0001 - 14565	1	4	KEYBOARD SUPPORT - 3000 CARRYING CASE
5	B	0001 - 14567	2	5	KEYBOARD BUMPER PAD - 3000 CARRYING CASE
6	D	0001 - 14570	1	11	LOGO, 3000 CARRYING CASE
7		-			
8		0285 - 00113	12	6	TUBULAR RIVET .218 LONG SST., .118 DIA.
9		0285 - 00101	4	7	TUBULAR RIVET .500 LONG SST., .118 DIA.
10					
11		0285 - 00102	8	12	TUBULAR RIVET .218 LONG SST., .085 DIA.
12		0625 - 00015	4	8	CATCH, SPECIAL
13		0625 - 00016	1	9	HANDLE, PADDED
14		0625 - 00017	2	10	HINGE, PLASTIC BOX,
15	C	0001 - 14777	1	13	SUPPORT, HANDLE
16	C	0001 - 14778	1	14	SUPPORT, REAR EDGE
17		-			
18		-			
19		-			
20		-			

See Figure 6-1, Sheet 2 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 1 of 30).

VARIABLE LIST OF MATERIALS
COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS
TITLE: ASSY, BASE CABINET
PAGE 2 OF 2
DWG. NO. A 0002 - 14548
REVISION

ITEM NO.	PART NUMBER	DESCRIPTION	14548-00	14548-01	14548-02	14548-03	REF DES.
1.	A0002-14597-00	REAR PANEL ASSY	1	-	-	-	
2.	A0002-14597-01	REAR PANEL ASSY	-	1	-	-	
3.	A0002-14597-02	REAR PANEL ASSY	-	-	1	-	
4.	A0002-14597-03	REAR PANEL ASSY	-	-	-	1	
5.	A0002-14551	FAN BRACKET ASSY	1	1	1	1	
6.	C0001-14787	DRIP SCREEN ASSY	1	1	1	1	
7.	D0001-14509	OPTION BOARD BRACKET	1	1	1	1	
8.	B0001-14632	OPTION BOARD PLATE	2	2	2	2	
9.	0282-00047	FASTENER, SPEED-NUT, 6-32 "U" TYPE	4	4	4	4	
10.	0286-00042	BUMPER RECESSED	4	4	4	4	
11.	0282-00049	SCREW, PHL.PAN HD. #6(.143)-19x.38LG. PLASTITE BLK.	7	7	7	7	
12.	0281-00064	SCREW, PHL.PAN HD. #4(.123)-20x.38LG. PLASTITE BLK.	13	13	13	13	
13.	0281-00065	SCREW, PHL.PAN HD.#4-40x.25LG. W/EXT TOOTH	2	2	2	2	
		LOCKWASHER SEMS BLACK					
14.	C0001-14784	GROUND STRAP, LEFT	1	1	1	1	
15.	C0001-14783	GROUND STRAP, RIGHT	1	1	1	1	
16.	0282-00001	NUT, #6-32, STEEL, CAD OR ZINC	2	2	2	2	
17.	0282-00006	SCREW, PHL. PN. HD. #6-32x.25 LG. BLK.·OXIDE	2	2	2	2	

See Figure 6-2, Sheets 1 and 2 for Component Locations.

LIST OF MATERIALS
COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS
TITLE: KEYBOARD HOUSING ASSY.
REF. ASS'Y: D0010-14562
DRAWING NUMBER A 0002– 14562
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REVISION

NO.	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1	A	0002 – 14585	1	1	KEYBOARD ASSY. 3000
2	D	0001 – 14531	1	2	KEYBOARD TOP
3	D	0001 – 14532	1	3	KEYBOARD BASE
4		–			
5		0282 – 00048	5	4	SCREW PAN HEAD SELF THREAD, CROSS RECESSED #6-19 X .50
6		0282 – 00002	5	5	LOCKWASHER #6 INTERNAL TOOTH
7		0286 – 00070	4	6	FOOT, RUBBER
8		–			
9		–			
10		–			
11		–			
12		–			
13		–			
14		–			
15		–			
16		–			
17		–			
18		–			
19		–			
20		–			

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See Figure 6-3, Sheet 1 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 2 of 30).

LIST OF MATERIALS
COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS
TITLE: KEYBOARD ASSEMBLY 3000
REF. ASS'Y: D0010-14585
DRAWING NUMBER A 0002– 14585
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REVISION

NO.	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1	D	0006 – 14500	1	1	KEYBOARD 3000
2	B	0010 – 14569	1	2	CABLE, 3000 TERMINAL
3		0282 – 00039	1	4	NUT, #6-32 SMALL PATTERN, HEX, STEEL, CAD OR ZINC
4		–			
5		0600 – 00002	1	3	TIEWRAP
6		–			
7		–			
8		–			
9		–			
10		–			
11		–			
12		–			
13		–			
14		–			
15		–			
16		–			
17		–			
18		–			
19		–			
20		–			

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See Figure 6-3, Sheet 2 for Component Location.

LIST OF MATERIALS
COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS
TITLE: ASSEMBLY, FRONT PANEL
REF. ASS'Y: D0010-14549
DRAWING NUMBER A 0002– 14549
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REVISION

NO.	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		–		1	
2	A	0002 – 14559	1	2	Assy, Cable, Signal, Interconnect (Motherboard to Disk Drive)
3	A	0002 – 14558	1	3	Assy, Cable, Power (Motherboard To Disk Drive)
4	D	0001 – 14536	1	4	Front Panel, 3000
5	D	0001 – 14601	1	5	Center Support (Panel)
6	D	0001 – 14583	1	6	Micro-Floppies Shield
7	D	0001 – 14596	1	7	Disc Filler Panel
8	D	0001 – 14529	1	8	Filter, CRT, 3000
9	C	0001 – 14516	1	9	Left Support (Panel)
10	C	0001 – 14517	1	10	Right Support (Panel)
11	C	0001 – 14631	1	11	Shield Insulator
12	B	0001 – 14608	1	12	Micro Floppies Support
13	B	0001 – 14630	1	13	Shield Retainer
14		–			
15		0430 – 00020	1	14	Micro Floppy Disc Drive
16		–			
17		0628 – 00005	1	15	Display Monitor, 5 x 9
18		–			
19		–			
20		–			

See Figure 6-4, Sheets 1 And 2 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 3 of 30).

LIST OF MATERIALS

COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS

TITLE: ASSEMBLY, FRONT PANEL

REF. ASS'Y: D0010-14549

DRAWING NUMBER A 0002-14549

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NO.	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		0281-00003	10	16	Washer, Int. Tooth Lock #4
2		0281-00025	2	17	Screw, Phl. Pan Hd. #4-40x3/16 Lg.
3		0281-00007	2	18	Screw, Phl. Pan Hd. #4-40x1/4 Lg.
4		–			
5		0282-00002	6	19	Washer, Int. Tooth Lock **#6**
6		–			
7		0287-00005	6	20	Screw, Phl. Pan Hd. #M3-8
8		–			
9		0600-00064	1	21	Cable Tie 3" Bundle Dia
10		–			
11		0282-00048	6	22	Scr. Phl.Pn.Hd. #6(.143)-19x.50 lg. Plastite Blk. Oxide
12		–			
13	A	0002-14571	1	23	FLOPPY FAN AND SPEAKER ASS'Y.
14		–			
15		–			
16		0621-00008	A/R	24	Tape, Transfer
17		–			
18		–			
19		–			
20		–			

See Figure 6-4, Sheets 1 and 2 for Component Locations.

LIST OF MATERIALS

COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS

TITLE: FLOPPY FAN AND SPEAKER ASSY

REF. ASS'Y: C0010-14571

DRAWING NUMBER A 0002-14571

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NO.	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		0210-00273	1	1 (P18/P14)	CONNECTOR 4 POSITION .100 CENTERS 24 AWG LOCKING
2		0210-00274	1	2	COVER 4 POSITION CONNECTOR
3		–			
4		0230-00027	1	3 (LSI)	SPEAKER, 0.1 WATTS 8 OHMS, MINIATURE, 1 3/4 SQ
5		–			
6		0260-00008	1	4 (B1,B1-W1, B1-W2)	FAN 6/12 VDC 80/50 MA
7		–			
8		0600-00025	A/R	5	TUBING 1/8 I.D. HEATSHRINKABLE BLACK
9		0600-00007	A/R	6 (W1)	WIRE, 24 GA 19/36 TYPE E TEFLON BLACK
10		0600-00016	A/R	7 (W2)	WIRE, 24 GA 19/36 TYPE E TEFLON WHITE
11		–			
12		0600-00002	1	8	TIE WRAP
13		–			
14		–			
15		–			
16		–			
17		–			
18		–			
19		–			
20		–			

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See Figure 6-4, Sheet 3 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 4 of 30).

LIST OF MATERIALS

COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS

TITLE: ASSY, PCB,CPU (64K)

REF. ASS'Y: D0010-14502-00

DRAWING NUMBER A 0002 - 14502-00

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NO	DWG SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		0004 - 14502	1	1	PC BOARD 3000 CPU/RAM
2	D	0003 - 14502	REF		CIRCUIT SCHEMATIC 3000 CPU/RAM BD
3		-			
4		-			
5	A	0900 - 14603	1	Z5	2764 8K X 8 E PROM
6	A	0900 - 14591	1	Z31	2764 8K X 8 EPROM
7	A	0900 - 14592	1	Z17	2764 8K X 8 E PROM
8	A	0900 - 14606	1	Z37	2764 8K X 8 E PROM
9		0485 - 00067 -T	1	Z19	I.C. 74LS00 LOW POWER SCHOTTKY 2 -INPUT NAND GATE
10		0485 - 00073 -T	1	Z12	I.C. 74LS74 DUAL D FLIP-FLOP W/CLEAR LOW POWER SCHOTTKY
11		0485 - 00078 -T	1	Z65	I.C. 74S08 QUAD 2 - INPUT AND SCHOTTKY
12		0485 - 00079 -T	1	Z61	I.C. 74S00 QUAD 2-INPUT NAND SCHOTTKY
13		0485 - 00094 -T	1	Z68	I.C. 74LS138 DECODER
14		0485 - 00096 -T	2	Z62,69	I.C. 74LS373 TRI STATE OCTAL D-TYPE LATCH
15		0485 - 00111 -T	4	Z54,60,67,70	I.C. 74LS244 TRI STATE OCTAL BUFFERS/DRIVERS
16		0485 - 00112 -T	1	Z44	I.C. 74LS04 HEX INVERTER
17		0485 - 00115 -T	3	Z7,63,71	I.C. 74LS245 OCTAL BUS TRANSCEIVER
18		0485 - 00118 -T	1	Z20	I.C. 74LS125 QUAD TRI-STATE BUFFER
19		0485 - 00146 -T	1	Z66	I.C. 74S139 DUAL 1-To-4 LINE DECODER
20		0485 - 00139 -T	1	Z72	I.C. 74HC10 TRIPLE 3-INPUT NAND GATE

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See Figure 6-5, Sheet 1 for Component Locations.

VARIABLE LIST OF MATERIALS

COMPUTER DEVICES INC.

TITLE: ASSY, PCB,CPU/RAM

DWG. NO. A 0002 - 14502

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ITEM NO	PART NUMBER	DESCRIPTION	QUANTITY 14502-01(128K)	14502-02(192K)	14502-03(256K)	REF DES.
	0486-00080 -T	HM4864-3 64 x 1 RAM	1	1	1	Z56
	0486-00080 -T	HM4864-3 64 x 1 RAM	-	1	1	Z57
	0486-00080 -T	HM4864-3 64 x 1 RAM	-	-	1	Z58
3	0150-00039	1.0UF 50 V +80-20% CAP	1	1	1	C2
			-	1	1	C3
			-	-	1	C4
			1	1	1	C7
			-	1	1	C8
			-	-	1	C9
			1	1	1	C14
			-	1	1	C15
			-	-	1	C16
			1	1	1	C21
			-	1	1	C22
			-	-	1	C23
			1	1	1	C27
			-	1	1	C28
			-	-	1	C29
			1	1	1	C33
			-	1	1	C34
			-	-	1	C35
			1	1	1	C39
			-	1	1	C40
	0150-00039	1.0UF 50V +80-20% CAP	-	-	1	C41

See Figure 6-5, Sheet 1 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 5 of 30).

ARIABLE LIST OF MATERIALS OMPUTER BURLINGTON EVICES INC. MASSACHUSETTS	TITLE: ASSY, PCB, CPU/RAM DWG. NO. A 0002 - 14502	PAGE 4 OF 4 REVISION	14502-01(128K) 14502-02(192K) 14502-03(256K)

EM O	PART NUMBER	DESCRIPTION	14502-01(128K)	14502-02(192K)	14502-03(256K)	REF DES.
	0150-00039	1.0 UF 50V +80-20 CAP	1	1	1	C43
	↑	↑	-	1	1	C44
			-	-	1	C45
			1	1	1	C51
	↓	↓	-	1	1	C52
	0150-00039	1.0 UF 50V +80-20 CAP	-	-	1	C53

See Figure 6-5, Sheet 1 for Component Locations.

LIST OF MATERIALS COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS	TITLE: ASSY, PCB, CPU (64K) REF. ASS'Y: D0010-14502-00	DRAWING NUMBER A 0002– 14502-00	PAGE 2 OF 5 REVISION

NO	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		0004 – 14502	1	1	PC BOARD 3000 CPU/RAM
2	D	0003 – 14502	REF		CIRCUIT SCHEMATIC 3000 CPU/RAM BD
3		–			
4		–			
5	A	0900 – 14603	1	Z5	2764 8K X 8 E PROM
6	A	0900 – 14591	1	Z31	2764 8K X 8 EPROM
7	A	0900 – 14592	1	Z17	2764 8K X 8 E PROM
8	A	0900 – 14606	1	Z37	2764 8K X 8 E PROM
9		0485 – 00067-T	1	Z19	I.C. 74LS00 LOW POWER SCHOTTKY 2 -INPUT NAND GATE
10		0485 – 00073-T	1	Z12	I.C. 74LS74 DUAL D FLIP-FLOP W/CLEAR LOW POWER SCHOTTKY
11		0485 – 00078-T	1	Z65	I.C. 74S08 QUAD 2 - INPUT AND SCHOTTKY
12		0485 – 00079-T	1	Z61	I.C. 74S00 QUAD 2-INPUT NAND SCHOTTKY
13		0485 – 00094-T	1	Z68	I.C. 74LS138 DECODER
14		0485 – 00096-T	2	Z62,69	I.C. 74LS373 TRI STATE OCTAL D-TYPE LATCH
15		0485 – 00111-T	4	Z54,60,67,70	I.C. 74LS244 TRI STATE OCTAL BUFFERS/DRIVERS
16		0485 – 00112-T	1	Z44	I.C. 74LS04 HEX INVERTER
17		0485 – 00115-T	3	Z7,63,71	I.C. 74LS245 OCTAL BUS TRANSCEIVER
18		0485 – 00118-T	1	Z20	I.C. 74LS125 QUAD TRI-STATE BUFFER
19		0485 – 00146-T	1	Z66	I.C. 74S139 DUAL 1-To-4 LINE DECODER
20		0485 – 00139-T	1	Z72	I.C. 74HC10 TRIPLE 3-INPUT NAND GATE

See Figure 6-5, Sheet 1 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 6 of 30).

LIST OF MATERIALS

COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS

TITLE: ASSY, PCB, CPU (64K)

REF ASS'Y: D0010-14502-00

DRAWING NUMBER: A 0002 – 14502-00

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NO	DWG SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		0485 – 00121 -T	1	Z25	I.C. 74LS20 DUAL 4-INPUT NAND GATE
2		0485 – 00122 -T	1	Z64	I.C. 74LS280 9 BIT PARITY GENERATOR
3		0485 – 00123 -T	2	Z50,59	I.C. 74LS158 QUAD 2-INPUT INVERTED MULTIPLEXER
4		–			
5		–			
6		0486 – 00092 -T	1	Z6	HM6116LP 2K X 8 STATIC RAM CMOS
7		–			
8		–			
9		–			
10		–			
11	A	0900 – 14678	1	Z51	512 X 8 BIPOLAR PROM
12		0486 00080 -T	9	Z1,8,13,21,27,33,40, 46,55	64K x 1 DRAM
13		0488 – 00025 -T	1	Z45	I.C. 8088 8 BIT MICROPROCESSOR
14		0488 – 00026 -T	1	Z52	I.C. 8284A CLOCK GENERATOR AND DRIVER
15		0488 – 00028 -T	1	Z53	I.C. 8288 BUS CONTROLLER
16		0488 – 00029 -T	1	Z39	TTLDM-100 100ns - DELAY MODULE
17		–			
18		–			
19		–			
20		0482 – 00008 -T	3	CR1-3	1N270 GERMANIUM DIODE

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See Figure 6-5, Sheets 1 for Component Locations.

LIST OF MATERIALS

COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS

TITLE: ASSY, PCB, CPU (64K)

REF ASS'Y: D0010-14502-00

DRAWING NUMBER: A 0002 – 14502-00

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NO	DWG SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		–			
2		–			
3		0150 – 00051	21	C5,10,11,17,18,24,25, 31,36,37,46,47,49	.1uF 50V MOLDED CERAMIC AXIAL LEAD
4		–		54-57,61-63,59	
5		0150 – 00039	10	C1,6,12,13,20,26,32, 38,42,50	1.0uF 50V +80 -20 CERAMIC CAP.
6		–			
7		–			
8		–			
9		0152 – 00034	5	C19,60,64,65,58	33uF 10V ±20% TANTALUM CAP.
10		0470 – 00084	1	R2	10KΩ 1/4W ±5% CARBON RESISTOR
11		0470 – 00020	1	R4	22Ω 1/4W ±5% CARBON RESISTOR
12		0470 – 00053	2	R5,6,	510Ω 1/4W ±5% CARBON RESISTOR
13		0470 – 00108	1	R1	100K 1/4W ±5% CARBON RESISTOR
14		–			
15		0470 – 00060	1	R3	1KΩ 1/4W ±5% CARBON RESISTOR
16		0476 – 00003	4	RP2,3,4,5	22Ω RESISTOR NETWORK 8 PIN 4 RESISTOR
17		0476 – 00077	4	RP1,6,7,8	4.7KΩ RESISTOR NETWORK 10 PIN SIP, 9 RES
18		–			
19		0230 – 00024	1	Y1	14.7456 MHz CRYSTAL
20		–			

BRUNING 40-105 45685 FORM 52

See Figure 6-5, Sheet 1 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 7 of 30).

LIST OF MATERIALS COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS	TITLE ASSY, PCB,CPU (64K) REF ASS'Y D0010-14502-00	DRAWING NUMBER A 0002 – 14502-00	PAGE 5 OF 5 REVISION

NO.	DWG SIZE	PART NUMBER	QTY	REF DESIGNATION	DESCRIPTION
1		0245 – 00005	1	BT-1	3.9V 1AH BATTERY LITHIUM -CARBON CELL
2		–			
3		–			
4		–			
5		–			
6		–			
7		0600 -00049	A/R	10	TUBING, 24GA TEFLON CLEAR (FOR Z19,58,60,64,65)
8		–			
9		0620 – 00004	A/R	7	ADHESIVE 108 RTV (USED FOR BT-1)
10		–			
11		–			
12		0210 – 00216	1	3	I.C. SOCKET 20 PIN LOW PROFILE (FOR Z51)
13		0210 – 00106	8	4	I.C. SOCKET 28 PIN LOW PROFILE (FOR Z5,6,17,18,31,32,37,38)
14		–			
15		0210 – 00088	2	5	I.C. SOCKET 40 PIN LOW PROFILE (Z26,45)
16		0600 – 00045	1.5"	11	WIRE 28GA 7/36 TYPE-E TEFLON (GREEN)
17		0600 – 00043	5"	12	WIRE 28GA 7/36 TYPE-E TEFLON (BROWN)
18		0600 – 00018	A/R	6	24 GA BUSS WIRE TINNED (FOR Y1)
19		–			
20		–			

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See Figure 6-5, Sheet 1 for Component Locations.

LIST OF MATERIALS COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS	TITLE: CRT BOARD 3000 REF. ASS'Y: D0010-14504	DRAWING NUMBER A 0002 – 14504	PAGE 2 OF 4 REVISION

NO.	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		0004 – 14504	1	1	PC BOARD CRT
2	D	0003 – 14504	REF		CIRCUIT SCHEMATIC CRT BOARD
3		–			
4		–			
5		–			
6	A	0900 – 14594	1	Z27	2764 8K X 8 EPROM
7		–			
8		–			
9		0485 – 00061-T	1	Z67	I.C. 74LS08 QUAD AND GATE
10		0485 – 00067-T	3	Z43,62,65	I.C. 74LS00 LOW POWER SCHOTTKY 2-INPUT NAND GATE
11		0485 00069-T	1	Z50	I.C. 74LS175 QUAD D F/F , POSITIVE EDGE, TRIGGERED
12		0485 – 00073-T	5	Z49,64,69,70,72	I.C. 74LS74 DUAL D F/F W/CLEAR LOW POWER SCHOTTKY
13		0485 – 00075-T	3	Z34,35,36	I.C. 74S174 HEX D F/F W/CLEAR SCHOTTKY
14		0485 – 00076-T	1	Z56	I.C. 74S175 QUAD D F/F W/CLEAR SCHOTTKY
15		0485 – 00077-T	1	Z54	I.C. 74S04 HEX INVERTER SCHOTTKY
16		0485 – 00079-T	3	Z38,46,60	I.C. 74S00 QUAD 2-INPUT NAND SCHOTTKY
17		0485 – 00092-T	1	Z61	I.C. 74LS393 DUAL 4 BIT DECADE AND BINARY COUNTER
18		0485 – 00091-T	1	Z68	I.C. 74S124 DUAL VOLTAGE CONTROLLED OSC.
19		0485 – 00094-T	4	Z25,33,37,44	I.C. 74LS138 DECODER
20		–			

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See Figure 6-6, Sheet 1 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 8 of 30).

LIST OF MATERIALS

COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS

TITLE: CRT BOARD 3000

REF. ASS'Y: D0010-14504

DRAWING NUMBER A 0002– 14504

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NO.	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		0485 – 00106-T	5	Z21-24, 30	I.C. 74LS374 OCTAL F/F W/COMMON OUTPUT ENABLE
2		0485 – 00107-T	1	Z55	I.C. 74S112 DUAL J-K NEG. EDGE-TRIGGERED F/F
3		0485 – 00108-T	3	Z40,47,53	I.C. 74S86 QUAD 2-INPUT EXCLUSIVE OR GATE
4		0485 – 00109-T	1	Z39	I.C. 74LS32 QUAD 2-INPUT POSITIVE OR GATE
5		0485 – 00110-T	1	Z41	I.C. 74LS157 QUAD 2-BIT MUX NON-INVERTING
6		0485 – 00111-T	1	Z51	I.C. 74LS244 TRI-STATE OCTAL BUFFERS/DRIVERS
7		0485 – 00112-T	2	Z42, 63	I.C. 74LS04 HEX INVERTER
8		0485 – 00113-T	3	Z26,28,32	I.C. 74LS166 OCTAL SHIFT REGISTER
9		0485 – 00115-T	1	Z74	I.C. 74LS245 OCTAL BUS TRANSCEIVER
10		0485 – 00117-T	1	Z52	I.C. 74S74 DUAL FLIP/FLOP
11		0485 – 00034-T	1	Z71	I.C. 7407 HEX BUFFER/DRIVER
12		0485 – 00119-T	1	Z66	I.C. 74LS139 DUAL 2 TO 4 LINE DECODER
13		0485 – 00131-T	2	Z31, 57	I.C. 74S02 QUAD 2 INPUT NORGATE
14		0485 – 00116-T	1	Z45	I.C. 74S10 TRIPLE 3-IN. NAND
15		0485 – 00114-T	2	Z58, 59	I.C. 74S32 QUAD 2-IN. -ORGATE
16		0485 – 00140-T	4	Z17-20	I.C. 74S374 OCTAL FLIP/FLOP 3 STATE OUT
17		0488 – 00023-T	1	Z29	I.C. 68B45S CRT CONTROLLER
18		0485 – 00141-T	1	Z48	I.C. 74S157 DATA SELECT MVX
19		0486 – 00079-T	16	Z1-16	I.C. 2118-3 16K X 1 +5V DRAM
20		0485 – 00105-T	1	Z73	I.C. 74LS273 OCTAL D FLIP-FLOP

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See Figure 6-6, Sheet 1 for Component Locations.

LIST OF MATERIALS

COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS

TITLE: CRT BOARD 3000

REF. ASS'Y: D0010-14504

DRAWING NUMBER A 0002– 14504

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NO.	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		0150– 00051	46	C2-9.11-32,34,35,38, 40,42-48,50-53	.1uf 50V MOLDED CERAMIC AXIAL LEAD
2		–			
3		–			
4		–			
5		0152– 00034	6	C1,10,33,39,41,37	33MFD 10V ± 20% TANTALUM CAP
6		0470– 00044	2	R1, 3	220Ω 1/4W ± 5% CARBON RESISTOR
7		0470– 00048	2	R2, 4	330Ω 1/4W ± 5% CARBON RESISTOR
8		0476– 00003	2	RP1,3	22Ω 8 PIN 4 SEPARATE RESISTOR SIP NETWORK
9		0476– 00077	1	RP2	4.7KΩ 10 PIN 9 RESISTOR SIP NETWORK
10		0476– 00019	1	RP4	560Ω 8 PIN 7 RESISTOR SIP NETWORK
11		–			
12		0230– 00022	1	Y1	22.2912 MHZ CRYSTAL
13		0230– 00023	1	Y2	13.4784 MHz CRYSTAL
14		–			
15		0560– 00022	1	L1	INDUCTOR 100 UH ± 10%
16		–			
17		0210– 00106	1	2	I.C. SOCKET 28 PIN LOW PROFILE (FOR Z27)
18		–			
19		0600– 00045	A/R	6	WIRE, 28 GA 7/36 TYPE-E TEFLON (GREEN)
20		0600– 00018	A/R	5	24 GA BUSS WIRE TINNED (FOR Y1 & Y2)

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See Figure 6-6, Sheet 1 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 9 of 30).

LIST OF MATERIALS **COMPUTER DEVICES INC.** BURLINGTON, MASSACHUSETTS	TITLE: Q160 THERMAL PRINTER GRAPHIC 3000 DOT REF ASS'Y: D0010-14552	DRAWING NUMBER A 0002 – 14552	PAGE 2 OF 2 REVISION

NO.	DWG SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1	A	0002 – 06645	1	1	FINAL ASSY Q160 PRINTER
2	A	0002 – 14505	1	2	PRINTER CONTROL BOARD
3	C	0001 – 14584	1	3	CARRIAGE MOTOR SHIELD
4	B	0001 – 06648	1	4	CONFIGURATION LABEL
5		0282 – 00032	4	5	KEPNUT #6-32
6		0286 – 00003	4	6	WASHER #6 FLAT, NYLON
7		0282 – 00045	4	7	SCREW #6-32 X 1.06 PAN HD, STEEL, CAD OR ZINC
8		0286 – 00071	4	8	SPACER, .25 RD X .62 LG, PHENOLIC
9		0282 – 00046	2	9	SCREW #6-32, X .19 LG SELF LOCKING
10	A	0002 – 14568	1	10	CABLE ASSY.(PRINTER TO PWR.SUPPLY)
11	A	0002 – 14556	1	11	CABLE ASSY. (PRINTER TO Z80)
12	B	0001 – 06627	4	12	CENTERING WASHER
13		0283 – 00023	4	13	NUT, HEX, KEP 8-32 STEEL, CAD OR ZINC
14		0286 – 00073	4	14	SHOCK MOUNT
15		–			
16		–			
17		–			
18		–			
19		–			
20		–			

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See Figure 6-7, Sheet 1 for Component Locations.

LIST OF MATERIALS **COMPUTER DEVICES INC.** BURLINGTON, MASSACHUSETTS	TITLE PRINTER CONTROL BD. 3000 REF ASS'Y: D0010-14505	DRAWING NUMBER A 0002 – 14505	PAGE 2 OF 5 REVISION

NO	DWG SIZE	PART NUMBER	QTY	REF DESIGNATION	DESCRIPTION
1		0004 – 14505	1	1	P.C. BOARD, PRINTER CONTROL
2	D	0003 – 14505	REF		CIRCUIT SCHEMATIC, PRINTER CONTROL BOARD
3		–			
4		–			
5		–			
6		–			
7	A	0900 – 14636	1	Z14	I.C. 2764 8K UV EPROM - Z14
8	A	0900 – 14637	1	Z15	I.C. 2764 8K UV EPROM - Z15
9		–			
10		–			
11		0485 – 00034-T	1	Z6	I.C. 7407 O.C. HEX BUFFERS/DRIVERS
12		0485 – 00133-T	1	Z8	I.C. 74C14 HEX SCHMITT TRIGGER
13		0485 – 00067-T	2	Z9,10	I.C. 74LS00 LOW POWER SCHOTTKY 2-IN NAND GATE
14		0485 – 00096-T	1	Z16	I.C. 74LS373 8 BIT LATCH
15		0485 – 00104-T	1	Z4	I.C. 74LS14 HEX SCHMITT TRIGGER INVERTER
16		–			
17		0486 – 00061-T	2	Z12,13	I.C. 6116 16K CMOS STATIC RAM
18		0486 – 00070-T	2	Z3,7	ULN 2069B QUAD DARLINGTON SWITCH
19		0486 – 00073-T	3	Z1,2,5	UHP 408 QUAD 2-INPUT NAND POWER DRIVER
20		–			

See Figure 6-8, Sheet 1 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 10 of 30).

LIST OF MATERIALS COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS	TITLE: PRINTER CONTROL BD. 3000 REF ASS'Y: D0010-14505	DRAWING NUMBER A 0002 – 14505	PAGE 3 OF 5 REVISION

NO	DWG SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		0488 – 00018 -T	1	Z17	I.C. 8031 C.P.U. W/RAM & I/O
2		0488 – 00019 -T	1	Z11	I.C. 8155 MICROPROCESSOR RAM W/I/O
3		–			
4		–			
5		0483 – 00010 -T	1	CR1	1N4749A 24V 1W ±10% ZENER DIODE
6		–			
7		0482 – 00002 -T	1	CR9	1N4148 SILICON DIODE
8		0482 – 00007 -T	12	CR2,3,4,7,11,-18	1N4002 SILICON DIODE
9		0482 – 00020 -T	2	CR5,6	GP30B 3 AMP 100V RECTIFIER
10		0482 – 00008 -T	1	CR10	IN270 GERMANIUM DIODE
11		–			
12		0480 – 00039 -T	1	Q3	2N4401 NPN SILICON SIGNAL TRANSISTOR
13		0480 – 00044 -T	2	Q1,2	TIP 125 TRANSISTOR DARLINGTON PNP
14		–			
15		–			
16		0150 – 00034	2	C7,8	22pF 100V ±10% CERAMIC CAP.
17		0150 – 00050	18	C1,10-20,22-27	.01uF 50V ±10% TEMP. STABLE
18		0150 – 00008	1	C9	.022uF 16V +80 -20% CERAMIC CAP.
19		0150 – 00039	1	C5	1.0uF 50V +80 -20% CERAMIC CAP
20		0150 – 00019	2	C21, C32	.001 MFD 50V ±10% TEMP. STABLE CAP

See Figure 6-8, Sheet 1 for Component Locations.

LIST OF MATERIALS COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS	TITLE: PRINTER CONTROL BD. 3000 REF ASS'Y D0010-14505	DRAWING NUMBER A 0002 – 14505	PAGE 4 OF 5 REVISION

NO	DWG SIZE	PART NUMBER	QTY	REF DESIGNATION	DESCRIPTION
1		–			
2		–			
3		–			
4		0152 – 00171	3	C2,C3,C6	15uF 35V -10 To +75% SEALED RAD. ALUM. ELECT. CAP.
5		0152 – 00036	1	C4	47uF 35V ±20% ELECTROLYTIC CAP.
6		--			
7		–			
8		–			
9		0470 – 00036	2	R6,23	100Ω 1/4W ±5% CARBON RESISTOR
10		0470 – 00060	4	R8, 19,21,22	1KΩ 1/4W ±5% CARBON RESISTOR
11		0470 - 00068	1	R10	2.2KΩ 1/4W ±5% CARBON RESISTOR
12		0470 – 00076	6	R4,5,7,15,18,20	4.7KΩ 1/4W ±5% CARBON RESISTOR
13		0470 – 00092	2	R1,2	22KΩ 1/4W ±5% CARBON RESISTOR
14		0470 – 00103	1	R24	100KΩ 1/4W ± 5% CARBON RESISTOR
15		0474 – 00018	1	R3	1.3Ω 2W ±5% WIRE WOUND RESISTOR
16		0470 – 00084	1	R16	10KΩ 1/4W ±5% CARBON RESISTOR
17		0475 – 00016	1	R17	50KΩ TRIMPOT SINGLE TURN
18		--			
19		0230 – 00019	1	Y1	11.0592 MHz CRYSTAL HC-U18 PACKAGE
20		–			

See Figure 6-8, Sheet 1 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 11 of 30).

LIST OF MATERIALS

COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS

TITLE PRINTER CONTROL BD.
3000

REF ASS'Y D0010-14505

DRAWING NUMBER A 0002- 14505

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NO.	DWG SIZE	PART NUMBER	QTY	REF DESIGNATION	DESCRIPTION
1		0210 - 00038	1	9	I.C. SOCKET 24 PIN LOW PROFILE (FOR Z12)
2		0210 - 00088	2	2	I.C. SOCKET 40 PIN LOW PROFILE (FOR Z11,17)
3		0210 - 00106	3	3	I.C. SOCKET 28 PIN LOW PROFILE (FOR Z13,14,15)
4		0210 - 00284	1	J 4	RIGHT ANGLE HEADER 20 PIN .100 X .100 CTR
5		0210 - 00218	1	J3	CONNECTOR 16 POS. FLEX CABLE
6		0210 - 00253	1	J1	10 PIN .156CTR RIGHT ANGLE HEADER
7		0210 - 00281	1	J2	5 PIN .100 CTR HEADER
8		-			
9		0281 - 00002	2	5	#4-40 HEX NUT SMALL PATTERN CAD OR ZINC
10		0281 - 00005	2	6	WASHER #4 EXTERNAL TOOTH CAD OR ZINC
11		0281 - 00008	2	7	SCREW #4-40 X 3/8 PAN HEAD CAD OR ZINC
12		0600 - 00018	A/R	8	24 GAUGE BUSS WIRE TINNED (JUMPERS)
13		0600 00045	A/R	10	WIRE 28 GA 7/36 TYPE-E TEFLON (GREEN)
14		0520 00022	1	11	TRANSI-PAD (FOR R17)
15		0620 00004	A/R	12	ADHESIVE 108 RTV
16		-			
17		0600 - 00019	A/R	13	22 GA BUS WIRE, TINNED
18		0600 - 00023	A/R	14	20 GA TEFLON TUBING, CLEAR
19		-			
20		-			

See Figure 6-8, Sheet 1 for Component Locations.

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Table 6-3. Detailed Parts List (Sheet 11A of 30).

LIST OF MATERIALS COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS	TITLE: FINAL ASSEMBLY - Q160 PLOTTING PRINTER REF. ASS'Y: D0010-06645	DRAWING NUMBER A 0002-06645	PAGE 2 OF 4 REVISION

NO.	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1	A	0002 - 06572	1	1	FRAME ASSEMBLY, Q160
2	A	0002 - 06615	1	2	LINE FEED MOTOR ASSEMBLY, Q160
3	A	0002 - 06581	1	3	PRINT HEAD ASSEMBLY, Q160
4	A	0002 - 06595	1	4	SOLENOID LINKAGE ASSEMBLY, Q160
5	B	0001 - 06522	1	5	CABLE RETAINING PIN Q160
6	C	0003 - 06554	REF	6	WIRING DIAGRAM, Q160
7	C	0001 - 06555	1	7	SOLENOID, Q160
8		-			
9		0254 - 00025	1	8	PULLEY 40 TOOTH, 40DP, Q160
10		-		OR	
11	C	0001 - 06613	1	8	PULLEY 40 TOOTH, 40DP, Q160
12		-			
13	D	0001 - 06540	1	33	HEAD LOADING BAR, Q160
14	A	0001 - 06591	1	34	BUSHING RIGHT SIDE HEAD LOADING BAR, Q160
15	A	0001 - 06592	1	35	BUSHING LEFT SIDE HEAD LOADING BAR, Q160
16	B	0001 - 06604	1	26	PIVOT PLATE HEAD MTG.
17		0210 - 00186	17	9	CONTACT, CRIMP SOCKET, 22-26 AWG
18		0210 - 00159	1	10	CONNECTOR HOUSING, 20 POSITION, DOUBLE ROW
19		0210 - 00160	1	11	POLARIZING PLUG
20	B	0001 - 06602	1	28	Q160 NAME PLATE

See Figure 6-9, Sheets 1, and 2 for Component Locations.

LIST OF MATERIALS COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS	TITLE: FINAL ASSEMBLY - Q160 PLOTTING PRINTER REF. ASS'Y: D0010 - 06645	DRAWING NUMBER A 0002- 06645	PAGE 3 OF 4 REVISION

NO.	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1	B	0001 - 06608	1	46	ENCODER MOUNTING PLATE
2		0254 - 00022	1	12	TIMING BELT, 76 TOOTH, 40 DP
3	B	0001 - 06609	1	43	ADJUSTING ROD
4	B	0001 - 06605	1	13	EXTENSION SPRING
5		0280 - 00011	2	32	SCREW, PAN HEAD, 2-56 X 3/8 LONG
6	A	0002 - 06610	1	45	ENCODER SENSOR PCB ASSEMBLY
7	B	0001 - 06652	1	47	EXTENSION SPRING
8		0281 - 00002	4	14	HEX NUT, 4-40
9		0281 - 00059	1	15	SET SCREW, CUP POINT, 4-40 X 3/16 LONG
10		0281 - 00052	5	16	SCREW,PAN HEAD, 4-40 X 1/4 LONG (SEMS)
11		0281 - 00055	4	17	SCREW, PAN HEAD, 4-40 X 5/16 LONG (SEMS)
12		-			
13		0281 - 00006	4	44	WASHER PLAIN #4
14		0282 - 00005	2	18	WASHER, PLAIN #6, SMALL PATTERN
15		0282 - 00040	2	19	SCREW PAN HEAD #6-32 X 3/4 LONG (SEMS)
16		0285 - 00037	1	36	E RING EXTERNAL 1/8 SHAFT
17		0285 - 00100	3	42	RETAINING RING 3/32 SHAFT
18		0510 - 00066	1	20	OPTICAL SWITCH DS1
19		-			
20		-			

See Figure 6-9, Sheets 1 and 2 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 12 of 30).

LIST OF MATERIALS COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS	TITLE: FINAL ASSEMBLY - Q160 PLOTTING PRINTER REF. ASS'Y: D0010 - 06645	DRAWING NUMBER A 0002 - 06645	PAGE 4 OF 4 REVISION

NO.	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		-			
2		0600 - 00002	11	22	TIE-WRAP
3		0600 - 00007	A/R	23	WIRE, 24GA, 19/36 TYPE-E TEFLON, BLACK
4		0600 - 00008	A/R	24	WIRE, 24GA, 19/36 TYPE-E TEFLON, BROWN
5		0600 - 00012	A/R	25	WIRE, 24GA, 19/36 TYPE-E TEFLON, GREEN
6		0600 - 00016	A/R	29	WIRE, 24GA, 19/36 TYPE-E TEFLON, WHITE
7		0600 - 00038	1.5"	27	#6 TUBING TEFLON
8		0620 - 00002	A/R	41	EPOXY, FIVE MINUTE
9		0285 - 00049	1	21	SOLDER LUG # LOCKING
10		0622 - 00004	A/R	31	OIL, LUBRICATING
11		0622 - 00006	A/R	48	GREASE, DAMPING
12		-			
13		-			
14		-			
15		-			
16		-			
17		-			
18		-			
19		-			
20		-			

See Figure 6-9, Sheets 1 and 2 for Component Locations.

LIST OF MATERIALS COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS	TITLE: FRAME ASSY. Q160 REF. ASS'Y: D0010-06572	DRAWING NUMBER A 0002 - 06572	PAGE 2 OF 3 REVISION

NO.	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1	A	0002 - 06589	1	1	BASE ASSEMBLY, Q160
2	A	0002 - 06569	1	2	RIGHT HAND SIDE PLATE ASSEMBLY, Q160
3	A	0002 - 06570	1	3	LEFT HAND SIDE PLATE ASSEMBLY, Q160
4	A	0002 - 06571	1	4	DRIVE ROLL ASSEMBLY, Q160
5	A	0002 - 06573	1	5	PLATEN ASSEMBLY, Q160
6	A	0002 - 06574	1	6	PINCH ROLLER ASSEMBLY, Q160
7	A	0002 - 06566	1	27	PAPER OUT SWITCH ASSEMBLY,Q160
8	B	0001 - 06525	1	7	DANCER BAR, Q160
9	B	0001 - 06531	1	8	CARRIAGE SHAFT, Q160
10	B	0001 - 06533	1	9	DANCER BAR TORSION SPRING, R.H., RED, Q160
11	B	0001 - 06534	1	10	DANCER BAR TORSION SPRING, L.H., YELLOW, Q160
12	B	0001 - 06536	1	11	PINCH ROLLER TORSION SPRING, R.H., BLUE, Q160
13	B	0001 - 06539	1	12	PINCH ROLLER TORSION SPRING, L.H., Q160
14	B	0001 - 06541	2	13	FLANGED BUSHING, 1/8 I.D.,Q160
15	C	0001 - 06548	1	14	CARRIAGE, Q160
16	D	0001 - 06551	1	15	PAPER GUIDE, Q160
17	B	0001 - 06558	6	16	ROUND NUT, 4-40, Q160
18		-			
19	B	0001 - 06636	1	30	NUT PLATE
20		-			

See Figure 6-9, Sheets 3 and 4 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 13 of 30).

LIST OF MATERIALS

COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS

TITLE: FRAME ASSEMBLY Q160

REF. ASS'Y: D0010-06572

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NO.	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		0281 – 00052	2	17	SCREW, PAN HD, 4-40 X ¼ LONG SEMS (CROSSED RECESSED)
2		0281 – 00053	4	18	SCREW, SOC HD CAP SCR. 4-40 X ¼ LONG SEMS
3		0281 – 00054	6	19	SCREW, PAN HD, 4-40 X ½ LONG SEMS (CROSSED RECESSED)
4		–			
5		0254 – 00023	1	20	TIMING BELT, 300 TOOTH, 40 D.P.
6		–			
7		0285 – 00080	1	24	SOLDER LUG
8		0285 – 00093	1	21	E RING 5131-25
9		0285 – 00095	2	22	E RING 5133-18
10		0285 – 00096	3	23	E RING 5133-25
11		0622 – 00003	A/R	25	SPINDLE OIL
12		0286 – 00027	1	26	RUBBER GROMMET
13		–			
14		0280 – 00011	2	28	SCREW, 2-56 X 3/8 PAN HEAD CAD STEEL
15		0280 – 00001	2	29	WASHER, #2 INT. TOOTH LOCK CAD STEEL
16		–			
17		–			
18		–			
19		–			
20		–			

See Figure 6-9, Sheets 3 and 4 for Component Locations.

LIST OF MATERIALS

COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS

TITLE: POWER SUPPLY ASSEMBLY

REF. ASS'Y: D0010-14561

DRAWING NUMBER A 0002 – 14561

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NO.	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1	D	0001 – 14535	1	1	COVER, POWER SUPPLY
2	C	0001 – 14629	1	2	POWER SUPPLY SHIELD
3		–			
4	A	0002 – 14506	1	3	ASSY, PCB, POWER SUPPLY
5	A	0002 – 14557	1	4	CABLE ASSY. POWER (POWER SUPPLY TO MOTHERBOARD)
6	B	0001 – 14782	1	10	LABEL, DANGER HIGH VOLTAGE
7		–			
8		–			
9		–			
10		–			
11		0281 – 00007	6	5	SCREW 4-40 x 1/4 PAN HD STEEL, CAD OR ZINC
12		0281 – 00005	10	6	WASHER #4 EXT. TOOTHLOCK, STEEL, CAD OR ZINC
13		0281 – 00006	10	7	WASHER #4 FLAT STEEL, CAD OR ZINC
14		0281 – 00008	2	8	SCREW, #4-40 x 3/8 PAN HD STEEL, CAD OR ZINC
15		0281 – 00001	2	9	NUT, HEX #4-40, STEEL, CAD OR ZINC
16		–			
17		–			
18		–			
19		–			
20		–			

See Figure 6-10, Sheet 1 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 14 of 30).

LIST OF MATERIALS

COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS

TITLE: 3000 POWER SUPPLY

REF. ASS'Y: D0010-14506

DRAWING NUMBER A 0002 – 14506

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NO	DWG SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1	D	0004 – 14506	1	1	P.C. BOARD, MACHINING, POWER SUPPLY
2	D	0003 – 14506	REF		CIRCUIT SCHEMATIC POWER SUPPLY
3	D	0002 – 14507	1	2	ASSY, PCB, POWER SUPPLY PIGGYBACK
4	C	0001 – 14649	1	3	HEATSINK, MACHINED
5	D	0001 – 14538	1	4	HEATSINK, DUAL (FOR CR6,7,12,13)
6		–			
7	A	0010 – 14642	1	L1	INDUCTOR 98uH 3.5 AMP
8	A	0010 – 14541	1	L2	INDUCTOR 98uH 7.5 AMP
9	A	0010 – 14542	1	L3	INDUCTOR 137uH 2 AMP
10	A	0010 – 14543	2	T2,T3	DRIVER TRANSFORMER
11	A	0010 – 14639	1	T4	POWER TRANSFORMER
12	A	0010 – 14545	1	T5	CURRENT TRANSFORMER
13		0560 – 00021	1	T1	TRANSFORMER 115V PRI 28V C.T. SEC. .085A
14		–			
15		0486 – 00067 -T	1	Z1	LM79M12 -12V VOLTAGE REGULATOR
16		0486 – 00069 -T	1	Z3	LM338 VOLTAGE REGULATOR
17		0486 – 00083 -T	1	Z2	I.C. SG3524 PULSE WIDTH MODULATOR
18		0486 – 00054	1	Z4	I.C 78H12 +12V VOLTAGE REGULATOR
19		–			
20		–			

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See Figure 6-10, Sheets 2 and 3 for Component Locations.

LIST OF MATERIALS

COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS

TITLE: 3000 POWER SUPPLY

REF. ASS'Y: D0010-14506

DRAWING NUMBER A 0002 – 14506

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NO	DWG SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		0482 – 00002 -T	7	CR11,1,15,16,17,18,14	1N4148 SILICON DIODE
2		0482 – 00003 -T	2	CR25,27	1N4936 SILICON FAST RECOVERY DIODE
3		0482 – 00007 -T	1	CR10	1N4002 DIODE 1A 100V
4		0482 – 00009 -T	8	CR21,22,5,4,24,26,23,2	1N4934 DIODE 1A FAST RECOVER
5		0482 – 00018 -T	2	CR8,9	6 AMP 100V RECTIFIER UES1302 FAST RECOVER
6		0482 – 00022 -T	1	BR2	1 AMP 200V BRIDGE RECTIFIER
7		0482 – 00026 -T	1	BR1	3 AMP 600V BRIDGE RECTIFIER
8		0482 – 00027 -T	2	CR6,7	10 AMP 100V DUAL RECTIFIER ULTRA FAST
9		0482 – 00028 -T	2	CR12,13	8 AMP 40V DUAL SCHOTTKY RECTIFIER
10		0482 – 00029 -T	2	CR19,20	2 AMP 200V RECTIFIER
11		0482 – 00031 -T	1	CR3	A15F OR HAB05 HIGH SURGE CURRENT DIODE
12		–			
13		–			
14		–			
15		–			
16		0487 – 00001	2	VR1,VR2	VARISTOR 10 JOULE 130V
17		–			
18		–			
19		0510 – 00068	2	TH1,2	THERMISTOR 10Ω 5 AMP
20		–			

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See Figure 6-10, Sheets 2 and 3 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 15 of 30).

LIST OF MATERIALS **COMPUTER DEVICES INC.** BURLINGTON, MASSACHUSETTS	TITLE: 3000 POWER SUPPLY REF. ASS'Y: D0010-14506	DRAWING NUMBER A 0002 – 14506	PAGE 4 OF 14 REVISION

NO	DWG SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		0480 – 00008 -T	1	Q7	2N4916 PNP TRANSISTOR
2		0480 – 00039 -T	1	Q1	2N4401 NPN TRANSISTOR
3		0480 – 00040 -T	2	Q3,4	2N4014 NPN TRANSISTOR
4		0480 – 00052 -T	2	Q5,6	MJE13007 NPN POWER TRANSISTOR
5		0481 – 00012 -T	1	Q2	MCR68-2 CROW BAR SILICON CONTROLLED RECTIFIER
6		–			
7		–			
8		0150 – 00014	2	C13,7	.01UF ±10% 50V NPO CERAMIC CAP
9		0150 – 00038	3	C8,10,14	.22UF +80 -20% 50V CERAMIC CAP
10		0150 – 00039	1	C11	1.0UF +80 -20% 50V CERAMIC CAP
11		0150 – 00045	1	C9	4700 PF ±5% 50V NPO CERAMIC CAP
12		0150 – 00049	2	C4,5	2200 PF ±20% 250V CERAMIC DISC CAP
13		–			
14		–			
15		0151 – 00015	1	C22	2UF ±10% 200V MYLAR CAP
16		–			
17		0152 – 00098	1	C15	33UF 10V ±20% ELECTROLYTIC
18		0152 – 00031	1	C6	10UF ±20% 10V ELECTROLYTIC CAP
19		0152 – 00033	4	C1,17,12,26	4.7UF ±20% 35V TANTALUM CAP
20		0152 – 00130	1	C18	470UF -10 +75% 16V SEALED RAD. ELECT. CAP

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See Figure 6-10, Sheets 2 and 3 for Component Locations.

LIST OF MATERIALS **COMPUTER DEVICES INC.** BURLINGTON, MASSACHUSETTS	TITLE: 3000 POWER SUPPLY REF. ASS'Y: D0010-14506	DRAWING NUMBER A 0002 – 14506	PAGE 5 OF 14 REVISION

NO	DWG SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		0152 – 00178	2	C2,19	220UF -10 +75% 35V SEALED RAD. ELECT. CAP
2		0152 – 00476	4	C24,25,23,3	2200UF -20 +75% 35V ELECTROLYTIC CAP
3		0152 – 00480	2	C16,20	470 UF ±20% 200V ELECTROLYTIC CAP.
4		–			
5		0153 – 00001	1	C21	220PF ±5% 500V MICA CAP
6		–			
7		0470 – 00005	2	R29A,R29B	3.9Ω 1/4W ±5% CARBON RESISTOR
8		0470 – 00009	2	R34,39	6.8Ω 1/4W ±5% CARBON RESISTOR
9		0470 – 00028	3	R35,40,28	47Ω 1/4W ±5% CARBON RESISTOR
10		0470 – 00044	1	R27	220Ω 1/4W ±5% CARBON RESISTOR
11		0470 – 00052	1	R10	470Ω 1/4W ±5% CARBON RESISTOR
12		0470 – 00060	2	R25,32	1KΩ 1/4W ±5% CARBON RESISTOR
13		0470 – 00064	1	R1	1.5KΩ 1/4W ±5% CARBON RESISTOR
14		0470 – 00068	4	R3,7,26,31	2.2KΩ 1/4W ±5% CARBON RESISTOR
15		0470 – 00071	2	R24,33	3KΩ 1/4W ±5% CARBON RESISTOR
16		–			
17		0470 – 00091	1	R14	20KΩ 1/4W ±5% CARBON RESISTOR
18		0470 – 00108	1	R11	100KΩ 1/4W ±5% CARBON RESISTOR
19		–			
20		–			

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See Figure 6-10, Sheets 2 and 3 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 16 of 30).

LIST OF MATERIALS
COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS
TITLE: 3000 POWER SUPPLY
REF. ASS'Y: D0010-14506
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NO	DWG SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		0471 – 00340	2	R18,17	200Ω 1/8W ±1% METAL FILM RESISTOR
2		0471 – 000[illegible]	1	R21	121Ω 1/8W ±1% METAL FILM RESISTOR
3		0471 – 00187	1	R4	1.5KΩ 1/8W ±1% METAL FILM RESISTOR
4		0471 – 00067	3	R19,20,41	348Ω 1/8W ±1% METAL FILM RESISTOR
5		0471 – 00222	1	R5	49.9 Ω 1/8W ±1% METAL FILM RESISTOR
6		0471 – 00345	1	R16	2.32KΩ 1/8W ±1% METAL FILM RESISTOR
7		0471 – 00032	1	R13	4.64KΩ 1/8W ±1% METAL FILM RESISTOR
8		–			
9		–			
10		0472 – 00016	1	R8	30Ω 1/2W ±5% CARBON RESISTOR
11		0472 – 00010	2	R9,2	100Ω 1/2W ±5% CARBON RESISTOR
12		0472 – 00017	2	R37,36	100K Ω 1/2W ±5% CARBON RESISTOR
13		–			
14		0473 – 00018	1	R38	1KΩ 1W ±5% WIRE WOUND RESISTOR
15		–			
16		0474 – 00016	1	R30	.15Ω 2W ±5% WIRE WOUND RESISTOR
17		–			
18		0474 – 00003	1	R23	100Ω 3W ± 5% WIRE WOUND RESISTOR
19		–			
20		–			

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See Figure 6-10, Sheets 2 and 3 for Component Locations.

LIST OF MATERIALS
COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS
TITLE: 3000 POWER SUPPLY
REF. ASS'Y: D0010-14506
DRAWING NUMBER A 0002– 14506
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NO	DWG SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		–		R6	TEST SELECT RESISTOR
2		0471 – 00067	A/R		348Ω 1/8W ±1% METAL FILM RESISTOR
3		0471 – 00070	A/R		402Ω 1/8W ±1% METAL FILM RESISTOR
4		0471 – 00002	A/R		499Ω 1/8W ±1% METAL FILM RESISTOR
5		0471 – 00209	A/R		649Ω 1/8W ±1% METAL FILM RESISTOR
6		0471 – 00081	A/R		698Ω 1/8W ±1% METAL FILM RESISTOR
7		0471 – 00211	A/R		750Ω 1/8W ±1% METAL FILM RESISTOR
8		0471 – 00213	A/R		825Ω 1/8W ±1% METAL FILM RESISTOR
9		0471 – 00085	A/R		887Ω 1/8W ±1% METAL FILM RESISTOR
10		0471 – 00087	A/R		976Ω 1/8W ±1% METAL FILM RESISTOR
11		0471 – 00089	A/R		1.07KΩ 1/8W ±1% METAL FILM RESISTOR
12		0471 – 00094	A/R		1.24KΩ 1/8W ±1% METAL FILM RESISTOR
13		–			
14		0471 – 00098	A/R		1.54KΩ 1/8W ±1% METAL FILM RESISTOR
15		–			
16		0471 – 00102	A/R		1.87KΩ 1/8W ±1% METAL FILM RESISTOR
17		0471 – 00106	A/R		2.26KΩ 1/8W ±1% METAL FILM RESISTOR
18		0471 – 00109	A/R		2.61KΩ 1/8W ±1% METAL FILM RESISTOR
19		–			
20		–			

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See Figure 6-10, Sheets 2 and 3 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 17 of 30).

LIST OF MATERIALS COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS	TITLE: 3000 POWER SUPPLY REF. ASS'Y: D0010-14506	DRAWING NUMBER A 0002-14506	PAGE 8 OF 14 REVISION

NO.	DWG SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		0471-00025	A/R	R6 (CON'T)	3.37KΩ 1/8W ± 1% METAL FILM RESISTOR
2		0471-00027	A/R		3.65KΩ 1/8W ±1% METAL FILM RESISTOR
3		-			
4		0471-00030	A/R		4.22KΩ 1/8W ±1% METAL FILM RESISTOR
5		0471-00033	A/R		4.87KΩ 1/8W ±1% METAL FILM RESISTOR
6		0471-00037	A/R		5.90KΩ 1/8W ±1% METAL FILM RESISTOR
7		0471-00114	A/R		7.68KΩ 1/8W ±1% METAL FILM RESISTOR
8		0471-00120	A/R		10.7KΩ 1/8W ±1% METAL FILM RESISTOR
9		0471-00132	A/R		19.6KΩ 1/8W ±1% METAL FILM RESISTOR
10		-			
11		-			
12		-			
13		-			
14		-			
15		-			
16		-			
17		-			
18		-			
19		-			
20		-			

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See Figure 6-10, Sheets 2 and 3 for Component Locations.

LIST OF MATERIALS COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS	TITLE: 3000 POWER SUPPLY REF. ASS'Y: D0010-14506	DRAWING NUMBER A 0002-14506	PAGE 9 OF 14 REVISION 3

NO.	DWG SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		-			
2		-			
3		-			
4		-			
5		-			
6		-		R22	TEST SELECT RESISTOR
7		0471-00087	A/R		976Ω 1/8W ±1% METAL FILM RESISTOR
8		0471-00019	A/R		1KΩ 1/8W ±1% METAL FILM RESISTOR
9		0471-00088	A/R		1.02KΩ 1/8W ±1% METAL FILM RESISTOR
10		0471-00178	A/R		1.05KΩ 1/8W ±1% METAL FILM RESISTOR
11		0471-00089	A/R		1.07KΩ 1/8W ±1% METAL FILM RESISTOR
12		0471-00180	A/R		1.10KΩ 1/8W ±1% METAL FILM RESISTOR
13		0471-00090	A/R		1.13KΩ 1/8W ±1% METAL FILM RESISTOR
14		0471-00181	A/R		1.15KΩ 1/8W ±1% METAL FILM RESISTOR
15		0471-00091	A/R		1.18KΩ 1/8W ±1% METAL FILM RESISTOR
16		0471-00182	A/R		1.21KΩ 1/8W ±1% METAL FILM RESISTOR
17		0471-00094	A/R		1.24KΩ 1/8W ±1% METAL FILM RESISTOR
18		0471-00244	A/R		1.27KΩ 1/8W ±1% METAL FILM RESISTOR
19		0471-00095	A/R		1.30KΩ 1/8W ±1% METAL FILM RESISTOR
20		-			

BRUNING 40-105 45685-2 FORM 52

See Figure 6-10, Sheets 2 and 3 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 18 of 30).

LIST OF MATERIALS **COMPUTER DEVICES INC.** BURLINGTON, MASSACHUSETTS	TITLE: 3000 POWER SUPPLY REF. ASS'Y: D0010-14506	DRAWING NUMBER A 0002 – 14506	PAGE 10 OF 14 REVISION

NO	DWG SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		–		R12	TEST SELECT RESISTOR
2		0471 – 00025	A/R		3.32KΩ 1/8W ±1% METAL FILM RESISTOR
3		0471 – 00026	A/R		3.48KΩ 1/8W ±1% METAL FILM RESISTOR
4		0471 – 00027	A/R		3.65KΩ 1/8W ±1% METAL FILM RESISTOR
5		0471 – 00028	A/R		3.83KΩ 1/8W ±1% METAL FILM RESISTOR
6		0471 – 00029	A/R		4.02KΩ 1/8W ±1% METAL FILM RESISTOR
7		0471 – 00030	A/R		4.22KΩ 1/8W ±1% METAL FILM RESISTOR
8		0471 – 00031	A/R		4.42KΩ 1/8W ±1% METAL FILM RESISTOR
9		0471 – 00032	A/R		4.64KΩ 1/8W ±1% METAL FILM RESISTOR
10		0471 – 00033	A/R		4.87KΩ 1/8W ±1% METAL FILM RESISTOR
11		0471 – 00034	A/R		5.11KΩ 1/8W ±1% METAL FILM RESISTOR
12		0471 – 00035	A/R		5.36KΩ 1/8W ±1% METAL FILM RESISTOR
13		0471 – 00036	A/R		5.62KΩ 1/8W ±1% METAL FILM RESISTOR
14		0471 – 00037	A/R		5.90KΩ 1/8W ±1% METAL FILM RESISTOR
15		0471 – 00038	A/R		6.49KΩ 1/8W ±1% METAL FILM RESISTOR
16		0471 – 00039	A/R		6.81KΩ 1/8W ±1% METAL FILM RESISTOR
17		0471 – 00040	A/R		7.15KΩ 1/8W ±1% METAL FILM RESISTOR
18		0471 – 00113	A/R		7.32KΩ 1/8W ±1% METAL FILM RESISTOR
19		0471 – 00114	A/R		7.68KΩ 1/8W ±1% METAL FILM RESISTOR
20		0471 – 00115	A/R		8.06KΩ 1/8W ±1% METAL FILM RESISTOR

BRUNING 40-105 45685-2

FORM 52

See Figure 6-10, Sheets 2 and 3 for Component Locations.

LIST OF MATERIALS **COMPUTER DEVICES INC.** BURLINGTON, MASSACHUSETTS	TITLE: 3000 POWER SUPPLY REF. ASS'Y: D0010-14506	DRAWING NUMBER A 0002 – 14506	PAGE 11 OF 14 REVISION

NO	DWG SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		0471 – 00116	A/R	R12 (CON'T)	8.87KΩ 1/8W ±1% METAL FILM RESISTOR
2		0471 – 00117	A/R		9.31KΩ 1/8W ±1% METAL FILM RESISTOR
3		0471 – 00118	A/R		9.76KΩ 1/8W ±1% METAL FILM RESISTOR
4		0471 – 00119	A/R		10.2KΩ 1/8W ±1% METAL FILM RESISTOR
5		0471 – 00120	A/R		10.7KΩ 1/8W ±1% METAL FILM RESISTOR
6		0471 – 00121	A/R		11.3KΩ 1/8W ±1% METAL FILM RESISTOR
7		0471 – 00122	A/R		11.8KΩ 1/8W ±1% METAL FILM RESISTOR
8		0471 – 00123	A/R		12.4KΩ 1/8W ±1% METAL FILM RESISTOR
9		0471 – 00124	A/R		13.0KΩ 1/8W ±1% METAL FILM RESISTOR
10		0471 – 00125	A/R		13.7KΩ 1/8W ±1% METAL FILM RESISTOR
11		0471 – 00126	A/R		14.3KΩ 1/8W ±1% METAL FILM RESISTOR
12		0471 – 00127	A/R		15.4KΩ 1/8W ±1% METAL FILM RESISTOR
13		0471 – 00128	A/R		16.2KΩ 1/8W ±1% METAL FILM RESISTOR
14		0471 – 00129	A/R		16.9KΩ 1/8W ±1% METAL FILM RESISTOR
15		0471 – 00130	A/R		17.8KΩ 1/8W ±1% METAL FILM RESISTOR
16		0471 – 00131	A/R		18.7KΩ 1/8W ±1% METAL FILM RESISTOR
17		0471 – 00132	A/R		19.6KΩ 1/8W ±1% METAL FILM RESISTOR
18		–			
19		–			
20		–			

BRUNING 40-105 45685-2

FORM 52

See Figure 6-10, Sheets 2 and 3 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 19 of 30).

LIST OF MATERIALS **COMPUTER DEVICES INC.** BURLINGTON, MASSACHUSETTS	TITLE: 3000 POWER SUPPLY REF. ASS'Y: D0010-14506	DRAWING NUMBER A 0002- 14506	PAGE 12 OF 14 REVISION 7

NO.	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		–		R15	TEST SELECT RESISTOR
2		0471 – 00003	A/R		4.75KΩ 1/8W ±1% METAL FILM RESISTOR
3		0471 – 00254	A/R		4.99KΩ 1/8W ±1% METAL FILM RESISTOR
4		0471 – 00297	A/R		5.23KΩ 1/8W ±1% METAL FILM RESISTOR
5		0471 – 00004	A/R		5.49KΩ 1/8W ±1% METAL FILM RESISTOR
6		0471 – 00202	A/R		5.76KΩ 1/8W ±1% METAL FILM RESISTOR
7		–			
8		–			
9		0510 – 00071	2	S1,S2	SWITCH,DPDT, VDE APPROVED
10		–			
11		–			
12		0511 – 00013	1	F1	FUSE, 2 AMP 250V (1" LONG)
13		–			
14		–			
15		–			
16		–			
17		0210 – 00251	1	J4	CONNECTOR, 7 POS LOCKING HEADER (.156)
18		0210 – 00308	1	J2	CONNECTOR, 10 POS LOCKING HEADER (.156)
19		0210 – 00290	1	J3	CONNECTOR, 14 POS LOCKING HEADER (.156)
20		0210 – 00148	14	J5	PIN TERMINALS (.025 SQ.)

BRUNING 40 105 45685-2

FORM 52

See Figure 6-10, Sheets 2 and 3 for Component Locations.

LIST OF MATERIALS **COMPUTER DEVICES INC.** BURLINGTON, MASSACHUSETTS	TITLE: 3000 POWER SUPPLY REF. ASS'Y: D0010-14506	DRAWING NUMBER A 0002-14506	PAGE 13 OF 14 REVISION 7

NO.	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		0620 – 00004	A/R	29	ADHESIVE 108 RTV
2		0210 – 00055	2	5	FUSE CLIP, P.C. BOARD MOUNTER (FOR F1)
3		–			
4		0520 – 00030	3	6	INSULATOR, THERMAL SILICON RUBBER
5		0520 – 00008	1	7	INSULATOR, THERMAL SILICON RUBBER TO-3 (FOR Z4)
6		–			
7		0520 – 00026	1	8	HEATSINK, TO-3 (FOR Z3)
8		0520 – 00028	1	9	HEATSINK, CAP (FOR Z3)
9		0520 – 00029	2	10	HEATSINK, TO-220 (FOR Q5,Q6)
10		–			
11		–			
12		–			
13		0600 – 00028	A/R	25	TUBING, 3/32 ID HEAT SHRINKABLE BLACK
14		0285 – 00107	1	13	STAND-OFF, 4-40 x 3/8 LG. RD. ALUM
15		0600 – 00100	A/R	11	16 GA CLEAR TEFLON TUBING (FOR BR1)
16		0600 – 00023	A/R	14	20 GA CLEAR TEFLON TUBING (FOR JP1)
17		0600 – 00024	A/R	15	22 GA CLEAR TEFLON TUBING (FOR T2,T3,T4, C2)
18		0600 – 00068	A/R	16	14 GA CLEAR TEFLON TUBING (FOR T4)
19		0600 – 00020	A/R	17	20 GA TEFLON 19/32 WIRE (FOR Z4)
20		0600 – 00018	A/R	12	WIRE 24 GA BUSS TINNED (FOR R23)

BRUNING 40 105 45685-2

FORM 52

See Figure 6-10, Sheets 2 and 3 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 20 of 30).

LIST OF MATERIALS **COMPUTER DEVICES INC.** BURLINGTON, MASSACHUSETTS	TITLE: 3000 POWER SUPPLY REF. ASS'Y: D0010-14506	DRAWING NUMBER A 0002 – 14506	PAGE 14 OF 14 REVISION

NO	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		0520 – 00017	2	28	TRANSIPAD (FOR Q3,Q4)
2		0286 – 00072	3	34	#2 SHOULDER WASHER, NYLON
3		0280 – 00010	5	37	#2-56 NUT
4		0281 – 00008	2	27	#4-40 x 3/8 PAN HEAD CAD OR ZINC
5		0281 – 00007	6	18	#4-40 X 1/4 PAN HEAD CAD OR ZINC
6		0281 – 00002	2	19	#4-40 HEX NUT SMALL PATTERN CAD OR ZINC
7		0281 – 00005	4	20	WASHER, #4 EXTERNAL TOOTH LOCK CAD STEEL
8		0281 – 00006	6	21	WASHER, #4 FLAT CAD STEEL
9		0286 – 00032	15	22	#4 FIBER, FLAT, WASHER
10		0285 – 00110	1	30	RING TERMINAL,SOLDERLESS #6 STUD 18-22 AWG.
11		0280 – 00009	3	35	#2 FLAT WASHER CAD OR STEEL
12		0282 – 00004	2	23	WASHER #6, SPLIT RING LIGHT LOCK CAD OR STEEL
13		0282 – 00039	2	24	#6-32 HEX NUT SMALL PATTERN CAD OR ZINC
14		–			
15		–			
16		0286 – 00046	2	33	#4 SHOULDER WASHER, NYLON
17	D	0001 – 14660	1	31	SWITCH ARM
18	B	0001 – 14646	1	32	CAUTION LABEL
19		0280 – 00024	5	36	#2-56 x 1/2 LG. TRUSS HD., STAINLESS STEEL
20		0280 – 00005	5	38	#2 WASHER, LOCK SPLIT HEAVY

See Figure 6-10, Sheets 2 and 3 for Component Locations.

LIST OF MATERIALS **COMPUTER DEVICES INC.** BURLINGTON, MASSACHUSETTS	TITLE: POWER SUPPLY (PIGGY BACK) REF. ASS'Y: D0010-14506	DRAWING NUMBER A 0002 – 14507	PAGE 2 OF 3 REVISION

NO	DWG SIZE	PART NUMBER	QTY	REF DESIGNATION	DESCRIPTION
1		0004 – 14507	1	1	P.C. BOARD POWER SUPPLY 3000 PIGGY BACK
2		0003 – 14507	REF		CIRCUIT SCHEMATIC POWER SUPPLY 3000 PIGGY BACK
3		–			
4		–			
5		–			
6		–			
7		0486 – 00089 T	1	Z4	I.C. SG3549 OVERCURRENT LATCH
8		0486 – 00087 T	2	Z1,2	I.C. LM339 QUAD COMPARATOR
9		0486 – 00088 T	1	Z3	I.C. LM358 DUAL OP-AMP
10		–			
11		–			
12		0482 – 00002 T	3	CR1,3,4	IN4148 SIGNAL DIODE
13		–			
14		–			
15		0483 – 00019 T	1	CR2	IN5234B 6.2V ± 5% ZENER DIODE
16		–			
17		0150 – 00039	2	C3,4	1.0uF 50V +80-20% CERAMIC BYPASS
18		0150 – 00057	1	C2	.056uF 50V ±10% CERAMIC CAP
19		0152 – 00033	1	C1	4.7uF 35V ±20% RADIAL LEAD CAP
20		–			

See Figure 6-10, Sheet 4 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 21 of 30).

LIST OF MATERIALS

COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS

TITLE: POWER SUPPLY (PIGGY BACK)

REF. ASS'Y: D0010-14506

DRAWING NUMBER A 0002 - 14507

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NO	DWG SIZE	PART NUMBER	QTY	REF DESIGNATION	DESCRIPTION
1		0470 - 00076	1	R5	4.7KΩ 1/4W ±5% CARBON RESISTOR
2		0470 - 00068	2	R3,4	2.2KΩ 1/4W ±5% CARBON RESISTOR
3		0470 - 00074	1	R13	3.9KΩ 1/4W ±5% CARBON RESISTOR
4		0470 - 00092	1	R8	22KΩ 1/4W ±5% CARBON RESISTOR
5		0471 - 00186	1	R1	9.53KΩ 1/8W 1% METAL FILM RESISTOR
6		0471 - 00108	2	R2,12	2.49KΩ 1/8W 1% METAL FILM RESISTOR
7		0470 - 00066	1	R10	1.8KΩ 1/4W ±5% CARBON RESISTOR
8		-			
9		0471 - 00301	1	R11	12.1K 1/8W 1% METAL FILM RESISTOR
10		0471 - 00266	1	R7	1.74K 1/8W 1% METAL FILM RESISTOR
11		0471 - 00037	1	R6	5.90KΩ 1/8W 1% METAL FILM RESISTOR
12		0470 - 00028	1	R14	47K ±5% 1/4W CARBON RESISTOR
13		0470 - 00116	1	R9	220K 1/4W ±5% CARBON RESISTOR
14		-			
15		-			
16		0210 - 00309	1	2	CONNECTOR, 14 POS. SINGLE ROW (.100 SP)
17		0600 - 00024	3	3	22 GA CLEAR TEFLON TUBING (FOR R14)
18		-			
19		-			
20		-			

See Figure 6-10, Sheet 4 for Component Locations.

VARIABLE LIST OF MATERIALS

COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS

TITLE: ASSY, BASE CABINET

DWG. NO. A 0002 - 14548

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ITEM NO.	PART NUMBER	DESCRIPTION	QUANTITY 14548-00	QUANTITY 14548-01	QUANTITY 14548-02	QUANTITY 14548-03	REF DES.
1.	A0002-14597-00	REAR PANEL ASSY	1	-	-	-	
2.	A0002-14597-01	REAR PANEL ASSY	-	1	-	-	
3.	A0002-14597-02	REAR PANEL ASSY	-	-	1	-	
4.	A0002-14597-03	REAR PANEL ASSY	-	-	-	1	
5.	A0002-14551	FAN BRACKET ASSY	1	1	1	1	
6.	C0001-14787	DRIP SCREEN ASSY	1	1	1	1	
7.	D0001-14509	OPTION BOARD BRACKET	1	1	1	1	
8.	B0001-14632	OPTION BOARD PLATE	2	2	2	2	
9.	0282-00047	FASTENER, SPEED-NUT, 6-32 "U" TYPE	4	4	4	4	
10.	0286-00042	BUMPER RECESSED	4	4	4	4	
11.	0282-00049	SCREW, PHL.PAN HD. #6(.143)-19x.38LG. PLASTITE BLK.	7	7	7	7	
12.	0281-00064	SCREW, PHL.PAN HD. #4(.123)-20x.38LG. PLASTITE BLK.	13	13	13	13	
13.	0281-00065	SCREW, PHL.PAN HD.#4-40x.25LG. W/EXT TOOTH	2	2	2	2	
		LOCKWASHER SEMS BLACK					
14.	C0010-14784	GROUND STRAP, LEFT	1	1	1	1	
15.	C0010-14783	GROUND STRAP, RIGHT	1	1	1	1	
16.	0282-00001	NUT, #6-32, STEEL, CAD OR ZINC	2	2	2	2	
17.	0282-00006	SCREW, PHL. PN. HD. #6-32x.25 LG. BLK. OXIDE	2	2	2	2	

See Figure 6-11, Sheet 1 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 22 of 30).

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See Figure 6-11, Sheet 1 for Component Locations.

VARIABLE LIST OF MATERIALS

COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS

TITLE: ASSY, REAR PANEL

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DWG. NO. A 0002 - 14597

REVISION

ITEM NO.	PART NUMBER	DESCRIPTION	14597-00	14597-01	14597-02	14597-03	REF. DES.
			QUANTITY				
1	A0002-14503-00	ASSY, PCB, Z-80 I/O BOARD	1	-	-	-	
2	A0002-14503-01	ASSY, PCB, Z-80 I/O BOARD	-	1	-	-	
3	A0002-14503-02	ASSY, PCB, Z-80 I/O BOARD	-	-	1	-	
4	A0002-14503-03	ASSY, PCB, Z-80 I/O BOARD	-	-	-	1	
5	D0001-14530	REAR PANEL	1	1	1	1	
6	C0001-14609	RJ11 BLANK	1	1	1	1	
7	0475-00032	POTENTIOMETER 100KΩ 1W	1	1	1	1	R1
8	0475-00033	POTENTIOMETER 500KΩ 1W	1	1	1	1	R2
9	0510-00069	ASSY, SWITCH, PB MOM, 5A, 250VAC, 1P	1	1	1	1	S1
10	0280-00022	SCR. PHL. PN. HD.#2-28X.25LG. PLAS.BLK. OXIDE	1	1	1	1	
11	0285-00007	STUD, SCREW LOCK, FEMALE #4-40	6	6	6	6	
12	0600-00025	TUBING SHRINK BLK. .125 I.D.	A/R	A/R	A/R	A/R	
13	0600-00009	WIRE INSUL. 24 AWG. RED	A/R	A/R	A/R	A/R	W8,W10
14	0600-00010	WIRE INSUL. 24 AWG. ORANGE	A/R	A/R	A/R	A/R	W5
15	0600-00011	WIRE INSUL. 24 AWG. YELLOW	A/R	A/R	A/R	A/R	W4,W13
16	0600-00012	WIRE INSUL. 24 AWG. GREEN	A/R	A/R	A/R	A/R	W3,W12
17	0600-00013	WIRE INSUL. 24 AWG. BLUE	A/R	A/R	A/R	A/R	W2
18	0600-00008	WIRE INSUL. 24 AWG. BROWN	A/R	A/R	A/R	A/R	W7,W6
19	0600-00014	WIRE INSUL. 24 AWG. VIOLET	A/R	A/R	A/R	A/R	W1
20	0600-00002	TIE WRAP	A/R	A/R	A/R	A/R	

See Figure 6-12, Sheet 1 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 23 of 30).

VARIABLE LIST OF MATERIALS

COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS

TITLE: ASSY P.C. BOARD MOTHERBOARD / KIT

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DWG. NO. A 0002-14503

REVISION

ITEM NO.	PART NUMBER	DESCRIPTION	QUANTITY 14503-02	REF DES.
1	A0002-14503-00	ASSEMBLY P.C. BOARD MOTHERBOARD	1	
2	A0002-14741	DUAL RS232 KIT	1	Z19/21

See Figure 6-12, Sheet 2 for Component Locations.

ABLE LIST OF MATERIALS

OMPUTER EVICES INC. BURLINGTON, MASSACHUSETTS

TITLE: ASSEMBLY, PCB, MOTHERBOARD

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DWG. NO. A 0002- 14503

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EM NO.	PART NUMBER	DESCRIPTION	QUANTITY 14503-01	14503-02	14503-03	REF DES.
1	A0002-14503-00	ASSEMBLY, PCB, MOTHERBOARD	1	1	1	
2	0488-00030	8253-5 PROGRAMMABLE INTERVAL TIMER	-	1	1	Z19
3	0488-00032	UPD 7201 MULTIPRO TOCOL SERIAL CONTROLLER	-	1	1	Z21
4	0488-00024	I.C. Z80B C.P.U. 16 BIT 40 PIN	1	-	1	Z28

See Figure 6-12, Sheet 2 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 24 of 30).

LIST OF MATERIALS

COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS

TITLE: ASSEMBLY, P.C. BOARD MOTHERBOARD

REF ASS'Y D0010-14503-00

DRAWING NUMBER A 0002-14503-00

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NO	DWG SIZE	PART NUMBER	QTY	REF DESIGNATION	DESCRIPTION
	D	0004-14503	1	1	P.C. BOARD, MOTHERBOARD
2	D	0003-14503	REF		CIRCUIT SCHEMATIC MOTHER BOARD
3					
4		-			
5	B	0001-14546	2	2	MYLAR INSULATOR
6		-			
7	A	0002-14651	1	3	P.C. BD ASSEMBLY, ANALOG SWITCH ADAPTER
8	A	0002-14676	1	4	P.C. BD ASSEMBLY, HEAD LOAD
9		-			
10		0485-00134-T	2	Z1, 16	I.C. 74LS153 DUAL 4 LINE TO 1 LINE MULTI
11		0485-00135-T	1	Z73	I.C. 74LS624 VOLTAGE CONTROLLED OSC
12		0485-00040-T	1	Z47	I.C. 7406 HEX INVERTER BUFFER OPEN COL.
13		0485-00041-T	4	Z3, 4, 8, 10	I.C. 1488 QUAD RS-232C LINE DRIVER
14		0485-00055-T	2	Z13, 59	I.C. 74LS10 3-IN-NAND LOW POWER SCHOTTKY
15		0485-00059-T	5	[illegible] 19	I.C. 1489 QUAD RS-232 LINE RECEIVER
16		0485-00061-T	2	Z55, [illegible]	I.C. 74LS08 QUAD AND GATE LOW POWER
17		0485-00067-T	[illegible]	Z37, [illegible]	I.C. 74LS00 2-IN NAND LOW POWER SCHOTTKY
18		0485-00071-T	1	Z53	I.C. 7438 QUAD 2-IN NAND OPEN COL. BUFFER
19		0485-00073-T	6	Z25,49,57,58,62,64	I.C. 74LS74 DUAL D F/F W/CLEAR LOW POWER SCHOTTKY
20		0485-00077-T	1	Z33	I.C. 74S04 HEX INVERTER SCHOTTKY

See Figure 6-12, Sheet 2 for Component Locations.

LIST OF MATERIALS

COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS

TITLE: ASSEMBLY, P.C. BOARD MOTHERBOARD

REF. ASS'Y: D0010-14503-00

DRAWING NUMBER A 0002-14503-00

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NO.	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		0485-00092-T	3	Z15, 67, 70	I.C. 74LS393 DUAL 4 BIT DECADE & BINARY COUNT
2		0485-00069-T	1	Z50	I.C. 74LS175 QUAD D F/F LOW POWER SCHOTTKY
3		0485-00093-T	1	Z74	I.C. 74LS629 DUAL VOLTAGE CONTROLLED OSC.
4		0485-00094-T	2	Z43, 48	I.C. 74LS138 DECODER
5		0485-00096-T	1	Z39	I.C. 74LS373 8 BIT LATCH
6		0485-00104-T	2	Z17, 46	I.C. 74LS14 HEX SCHMITT TRIGGER INVERTER
7		0485-00109-T	3	Z12, 52, 54	I.C. 74LS32 QUAD 2-IN POSITIVE OR
8		0485-00111-T	2	Z44, 45	I.C. 74LS244 TRI-STATE OCTAL BUFFER/DRIVER
9		0485-00112-T	1	Z29	I.C. 74LS04 HEX INVERTER
10		0485-00115-T	1	Z26	I.C. 74LS245 OCTAL BUS TRANSCEIVER
11		0485-00117-T	1	Z66	I.C. 74S74 DUAL FLIP-FLOP
12		0485-00062-T	1	Z56	I.C. 74LS11 3-IN AND
13		0485-00119-T	1	Z24	I.C. 74LS139 DUAL 2 TO 4 LINE DECODER
14		0485-00120-T	1	Z51	I.C. 74LS243 QUAD TRANSCEIVER
15		0485-00128-T	1	Z42	I.C. 74LS670 4X4 REGISTER FILE TRI-STATE
16		0485-00017-T	1	Z71	I.C. 74165 8 BIT PARALLEL LOAD SHIFT REGISTER
17		0485-00136-T	1	Z65	I.C. 74LS123 DUAL RETRIGGERABLE MONOSTABLE OSC
18		0485-00137-T	2	Z69, 72	I.C. 74LS221 DUAL MONOSTABLE MULTI/SCHMITT TRIG.
19		0485-00090-T	1	Z68	I.C. MC4044 DUAL PHASE FREQ DETECTER
20		0485-00138-T	1	Z11	I.C. 74LS368 HEX BUS DRIVERS 3 STATE OUTPUTS

See Figure 6-12, Sheet 3 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 25 of 30).

LIST OF MATERIALS COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS	TITLE: ASSEMBLY P.C. BOARD MOTHERBOARD REF. ASS'Y: D0010-14503-00	DRAWING NUMBER A 0002-14503-00	PAGE 4 OF 8 REVISION

NO.	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		-			
2	A	0901-14681-	1	Z63	I.C. 82S123 32X8 PROM TRI-STATE
3		-			
4		0488-00030-T	1	Z18,	8253-5 PROGRAMMABLE INTERVAL TIMER
5		0488-00032-T	1	Z22	UPD7201 MULTIPROTOCOL SERIAL CONTROLLER
6		0488-00034-T	1	Z20	8259A PROGRAMMABLE INTERRUPT CONTROLLER
7		0488-00035-T	1	Z23	8255A-5 PROGRAMMABLE PERIPHERAL INTERFACE
8		0488-00036-T	1	Z31	MM58174 MICROPROCESSOR REAL TIME CLOCK
9		0488-00037-T	1	Z38	8237A-5 PROGRAMMABLE DMA CONTROLLER
10		0488-00038T	1	Z32	TTLDL-30 30NS TTL DELAY LINE
11		-			
12		-			
13		-			
14		0230-00025	1	X1	32.768 KHZ QUARTZ WATCH CRYSTAL
15		0230-00026	1	X2	16 MHZ QUARTZ CRYSTAL
16		-			
17		-			
18		0480-00039T	3	Q1,3,4	2N4401 NPN SILICON SIGNAL TRANSISTOR
19		-			
20		0560-00022	1	L1	100UH ±10% INDUCTOR

See Figure 6-12, Sheet 2 for Component Locations.

LIST OF MATERIALS COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS	TITLE: ASSEMBLY P.C. BOARD MOTHERBOARD REF. ASS'Y: D0010-14503-00	DRAWING NUMBER A 0002-14503-00	PAGE 5 OF 8 REVISION

NO.	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		-			
2		0150-00034	1	C37	22PF 100V ±10% CERAMIC CAP
3		0150-00052	1	C82	82 PF 50V ±5% TEMP STABLE CERAMIC CAP
4		0150-00026	1	C81	100PF 100V ±10% CERAMIC CAP
5		0150-00053	1	C84	150PF 50V ±5% CERAMIC CAP
6		0150-00054	1	C83	270PF 50V ±5% CERAMIC CAP
7		0150-00055	2	C85,87	680PF 50V ±5% CERAMIC CAP
8		0150-00036	1	C86	4700 PF 50V ±10% CERAMIC CAP
9		0150-00044	1	C89	.01UF 50V +80-20% CERAMIC CAP
10		0150-00029	1	C80	.068UF 50V ±10% CERAMIC CAP
11		0150-00043	1	C77	.1UF 50V +80-20% CERAMIC CAP
12		0150-00056	1	C68	.033UF 50V ±10% TEMP STABLE CAP
13		0150-00050	40	C2,3,4,6,9-13,15,16,17 32-36,38,40-43,47,48,53, 56-59,61,62,64,65,70,27, 29,74,75,76,78	.01UF 50V +80%-20% CERAMIC CAP AXIAL LEAD
14		-			
15		-			
16		-			
17		0152-00033	7	C1,23-26,31,88	4.7UF 35V ±20% CAP. SOLID TANTALUM ELECT.
18		0152-00031	2	C21,52	10UF 10V ±20% ELECTROLYTIC CAP
19		0152-00458	7	C7,14,20, 60,66, 73,79	22UF 50V ±20% ELECTROLYTIC CAP
20		-			

See Figure 6-12, Sheet 2 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 26 of 30).

LIST OF MATERIALS

COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS

TITLE: ASSEMBLY P.C. BOARD MOTHERBOARD

REF. ASS'Y: D0010-14503-00

DRAWING NUMBER A 0002-14503-00

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NO.	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		0482-00008T	1	CR1	IN270 GERMANIUM DIODE
2		0482-00025-T	1	CR5	1N4001 SILICON RECT DIODE
3		0483-00021-T	1	CR6	IN747A 3.6V ±5% ZENER DIODE
4		-			
5		0475-00005	2	R16,21	10KΩ TRIM POTENTIOMETER
6		-			
7		0476-00013	1	RP5	150Ω RESISTOR NETWORK 8 PIN SIP
8		0476-00001	3	RP1,3,4	4.7KΩ RESISTOR NETWORK 8 PIN SIP
9		0470-00030	2	R14,15	56Ω 1/4W ±5% CARBON RESISTOR
10		0470-00036	5	R18,19,38,39,48	100Ω 1/4 W ±5% CARBON RESISTOR
11		0470-00053	1	R24	510Ω 1/4W ±5% CARBON RESISTOR
12		0470-00060	4	R5,26,34,37	1KΩ 1/4W ±5% CARBON RESISTOR
13		0470-00067	3	R25,27,28	2KΩ 1/4W ±5% CARBON RESISTOR
14		0470-00068	1	R36	2.2KΩ 1/4W ±5% CARBON RESISTOR
15		0470-00071	3	R22,23,33	3KΩ 1/4W ±5% CARBON RESISTOR
16		0470-00072	2	R6,35	3.3KΩ 1/4W ±5% CARBON RESISTOR
17		0470-00074	1	R32	3.9KΩ 1/4W ±5% CARBON RESISTOR
18		0470-00076	10	R2,3,4,11,12,17,20,40,45,46	4.7KΩ 1/4W ±5% CARBON RESISTOR
19		0470-00082	1	R29	8.2KΩ 1/4W ±5% CARBON RESISTOR
20		0470-00013	1	R13	10KΩ 1/4W ±5% CARBON RESISTOR

See Figure 6-12, Sheet 2 for Component Locations.

LIST OF MATERIALS

COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS

TITLE: ASSEMBLY P.C. BOARD MOTHERBOARD

REF. ASS'Y: D0010-14503-00

DRAWING NUMBER A 0002-14503-00

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REVISION

NO.	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		0470-00108	1	R1	100KΩ 1/4W ±5% CARBON RESISTOR
2		0210-00290	1	J1	HEADER, STRAIGHT, LOCKING .156 CTR. 14POS.
3		0210-00249	2	J2,4	62 POS EDGE CARD CONN
4		0210-00128	2	J3,5	72 POS EDGE CARD CONN.
5		0210-00062	2	J6,7	25 POS. LOCKING SUB MINI 'D' CONNECTOR
6		0210-00281	1	J8	5 POS LOCKING MOLEX HEADER
7		-			
8		-			
9		0210-00148	9	J16	.025 SQ. BERG TERMINAL POSTS
10		0210-00255	1	J12	9 PIN LOCKING SUB MINI 'D' CONNECTOR
11		0210-00293	1	J15A, J15B	8 POS LOCKING HEADER
12		0210-00246	1	J13	26 POS LOCKING HEADER
13		0210-00294	1	J14	2 POS LOCKING HEADER .100 CENTER
14		0210-00155	1	29	2 POS. RECEPTICLE HOUSING
15		0210-00005	2	28	CONTACT SOCKET 24-30AWG - WIRE CRIMP
16		-			
17		0600-00007	15 IN	26	WIRE 24GA 19/36 TYPE-E TEFLON (BLK)
18		0600-00009	15 IN	27	WIRE 24GA 19/36 TYPE-E TEFLON RED
19		0210-00038	1	5	I.C. SOCKET 24 PIN LOW PROFILE (FOR Z19)
20		0210-00088	3	6	I.C. SOCKET 40 PIN LOW PROFILE (FOR Z21,22,38)

See Figure 6-12, Sheet 2 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 27 of 30).

LIST OF MATERIALS

COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS

TITLE: ASSEMBLY P.C. BOARD MOTHERBOARD

REF. ASS'Y: D0010-14503-00

DRAWING NUMBER A 0002-14503-00

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REVISION

NO.	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1		0600 -00037	A/R	7	WIRE 20GA 19/32 TYPE-E TEFLON WHITE
2		0600 -00103	A/R	8	WIRE 20GA 19/32 TYPE-E TEFLON BLACK
3		0600 -00140	A/R	9	WIRE 20GA 19/32 TYPE-E TEFLON RED
4		0600 -00136	A/R	10	WIRE 22GA 19/34 TYPE-E TEFLON ORANGE
5		0600 -00029	A/R	11	WIRE 28GA 7/36 TYPE-E TEFLON WHITE
6		0600 -00039	A/R	12	WIRE 28GA 7/36 TYPE-E TEFLON RED
7		0600 -00040	A/R	13	WIRE 28GA 7/36 TYPE-E TEFLON YELLOW
8		0600 -00041	A/R	14	WIRE 28GA 7/36 TYPE-E TEFLON ORANGE
9		0600 -00043	A/R	15	WIRE 28GA 7/36 TYPE-E TEFLON BROWN
10		0600 -00045	A/R	16	WIRE 28GA 7/36 TYPE-E TEFLON GREEN
11		0600 -00046	A/R	17	WIRE 28GA 7/36 TYPE-E TEFLON VIOLET
12		0600 -00059	A/R	18	WIRE 28GA 7/36 TYPE-E TEFLON BLACK
13		-			
14		0600 -00018	A/R	19	24GA BUSS WIRE TINNED (FOR XZ)
15		0600 -00024	A/R	20	TUBING 22GA CLEAR TEFLON
16		-			
17		0286 -00032	6	21	#4 FIBER WASHER
18		0281 -00002	6	22	#4-40 HEX NUT SMALL PATTERN CAD OR ZINC
19		0281 -00005	6	23	#4 WASHER, EXT TOOTH LOCK
20		0281 -00008	6	24	#4-40 X 3/8 PAN HD. CAD OR ZINC

See Figure 6-12, Sheet 2 for Component Locations.

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Table 6-3. Detailed Parts List (Sheet 28 of 30).

LIST OF MATERIALS **COMPUTER DEVICES INC.** BURLINGTON, MASSACHUSETTS	TITLE: ANALOG SWITCH ADAPTER 3000 REF. ASS'Y: B0010-14651	DRAWING NUMBER A 0002 – 14651	PAGE 2 OF 2 REVISION

NO.	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1	B	0004 – 14651	1	1	P.C. BOARD MACHINING, ANALOG SWITCH ADAPTER
2	B	0003 – 14651	REF.		CIRCUIT SCHEMATIC, ANALOG SWITCH ADAPTER
3		–			
4		–			
5		0486 – 00090 -T	1	Z1	I.C. DC211CJ QUAD MONOLITHIC ANALOG SWITCH
6		0210 – 00324	1	Z2	I.C. SOCKET, 8 PIN WIRE WRAP
7		–			
8		–			
9		–			
10		–			
11		–			
12		–			
13		–			
14		–			
15		–			
16		–			
17		–			
18		–			
19		–			
20		–			

See Figure 6-12, Sheet 11 for Component Locations.

LIST OF MATERIALS **COMPUTER DEVICES INC.** BURLINGTON, MASSACHUSETTS	TITLE: Z80 IO MOTHERBOARD SWAP LOGIC ADAPTER REF. ASS'Y: B0010-14580	DRAWING NUMBER A 0002 – 14644	PAGE 2 OF 2 REVISION

NO.	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1	C	0004 – 14644	1	1	P.C. BOARD: Z80 IO MOTHERBOARD, SWAP LOGIC ADAPTER
2	B	0003 – 14644	REF		CIRCUIT SCHEMATIC: Z80 IO MOTHERBOARD,SWAP LOGIC ADAPTER
3		0007 –	REF		TEST PROCEDURE
4		–			
5		–			
6		0485 – 00065	1	Z1	I.C. 74LS174 HEX D F/F CLEAR LOW POWER SCHOTTKY
7		0485 – 00112	1	Z2	I.C. 74LS04 HEX INVERTER
8		0210 –00037	1	2	I.C. SOCKET 16 PIN
9		–			
10		0150 –00051	1	C1	.1µf 50V MOLDED CERAMIC CAP
11		–			
12		–			
13		0600 –00022	3"	3	WIRE 20 GA 19/32 TYPE-E TEFLON GREEN
14		–			
15		–			
16		–			
17		–			
18		–			
19		–			
20		–			

BRUNING 40-105 45685-2

FORM 52

See Figure 6-12, Sheet 13 For Component Locations.

Table 6-3. Detailed Parts List (Sheet 29 of 30).

LIST OF MATERIALS
COMPUTER DEVICES INC. BURLINGTON, MASSACHUSETTS
TITLE: HEAD LOAD BOARD 3000
REF. ASS'Y: C0010-14676
DRAWING NUMBER A 0002 – 14676
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NO.	DWG. SIZE	PART NUMBER	QTY	REF. DESIGNATION	DESCRIPTION
1	C	0004 – 14676	1	1	P.C. BOARD MACHINING, HEAD LOAD BOARD
2	B	0003 – 14676	REF.		CIRCUIT SCHEMATIC HEAD LOAD BOARD
3		–			
4		0485 – 00069-T	1	Z1	I.C. 74LS175 QUAD D F/F LOW POWER SCHOTTKY
5		–			
6		0488 – 00031-T	1	Z2	I.C. UPD765A FLOPPY DISC CONTROLLER
7		0210 – 00323	1	Z2	I.C. SOCKET 40 PIN WIRE WRAP
8		–			
9		0150 – 00051	2	C2,3	0.1 UF 50 V MOLDED CERAMIC AXIAL LEAD
10		0152 – 00033	1	C1	4.7 UF 35 V ±20% RADIAL LEAD CAP
11		–			
12		0470 – 00060	2	R1,R2	1kΩ 1/4W ±5% CARBON RESISTOR
13		–			
14		–			
15		–			
16		–			
17		–			
18		–			
19		–			
20		–			

See Figure 6-12, Sheet 14 for Component Locations.

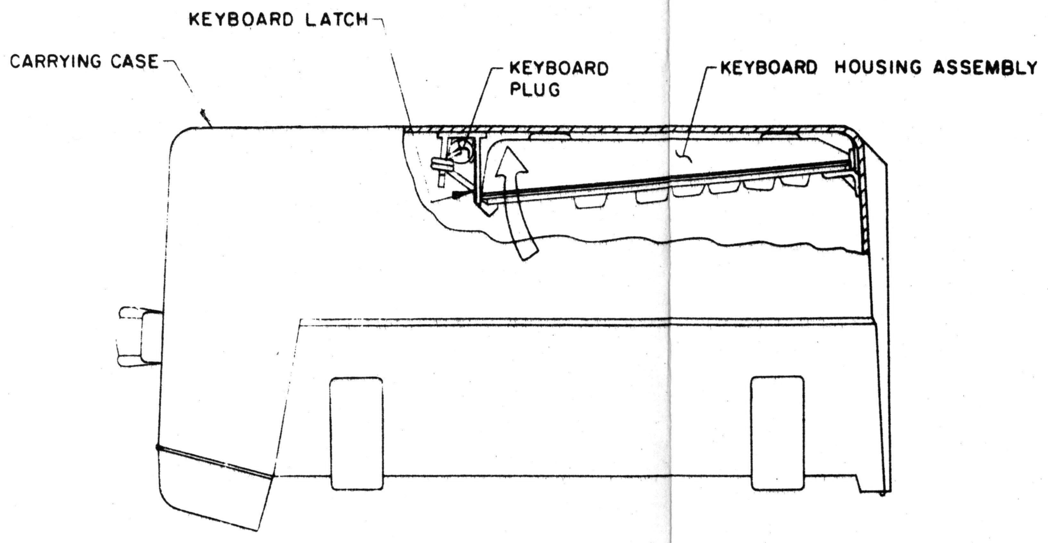
Note

For Figure 6-13 Parts List, See Figure 6-13 Sheets 6, 7, 8, and 9

For Figure 6-14 Parts List, See Figure 6-14 Sheets 4 and 5

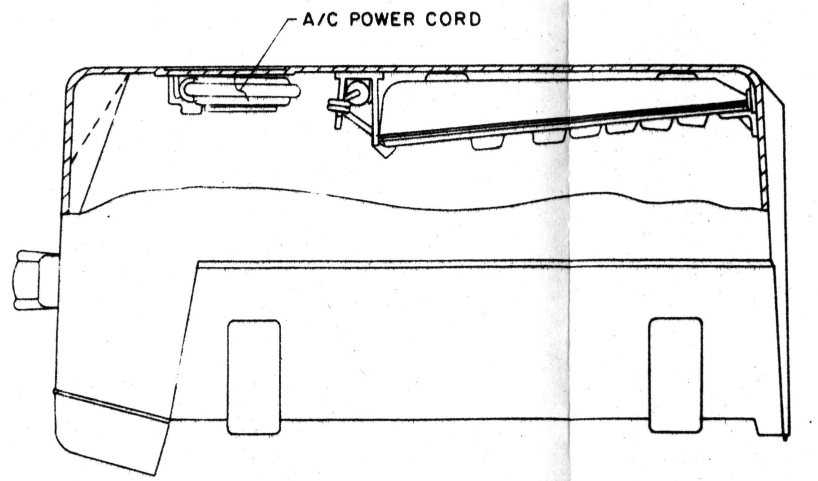
Table 6-3. Detailed Parts List, (Sheet 30 of 30).

STEP #1


KEYBOARD LATCH
CARRYING CASE
KEYBOARD PLUG
KEYBOARD HOUSING ASSEMBLY

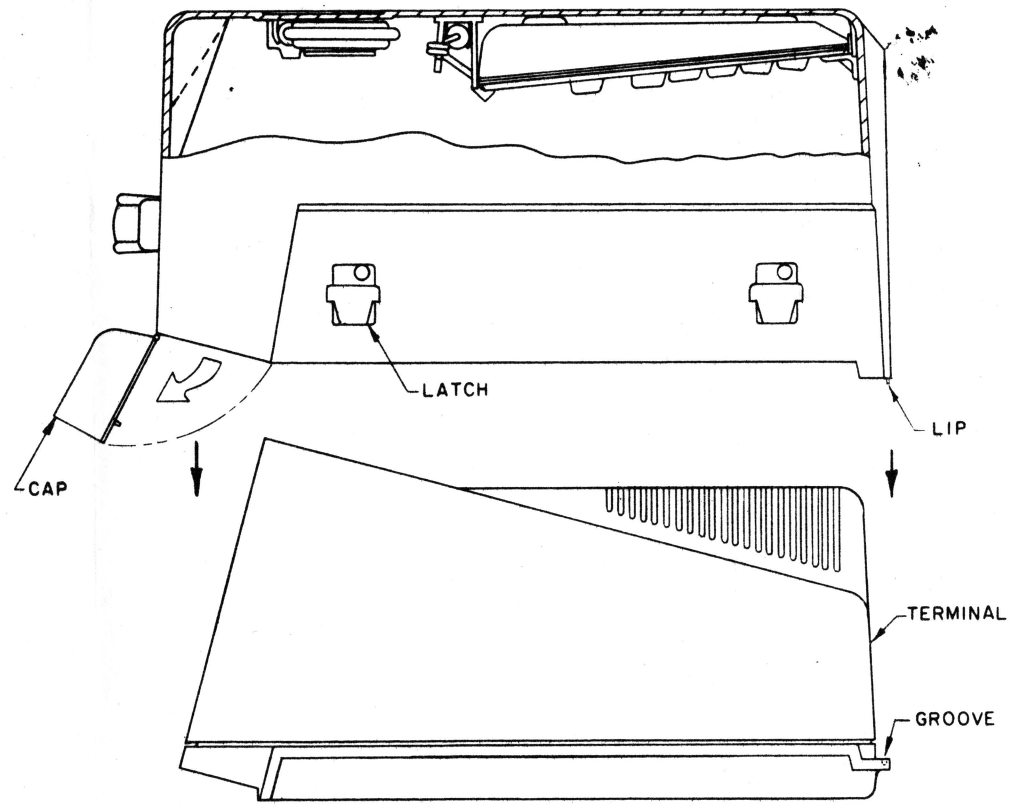
- PLACE KEYBOARD HOUSING ASSEMBLY IN POSITION SHOWN AND FASTEN WITH KEYBOARD LATCH.
- WRAP KEYBOARD CABLE SEVERAL TIMES AROUND OUTER POST OF LATCH PLATE AND SNAP PLUG INTO HOLDER AS SHOWN.

STEP #2


A/C POWER CORD

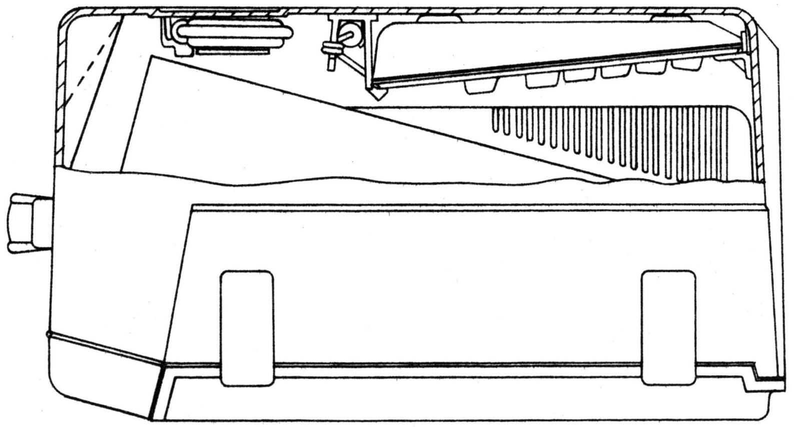
- SNAP PLUG END OF CORD INTO SMALLER CLIP AND WIND AROUND POST AT EACH END. THE RECEPTACLE WILL FALL IN LINE WITH ONE OF THE FOUR LARGER CLIPS IN THE CENTER AND SHOULD BE SNAPPED INTO PLACE.

STEP #3


LATCH
LIP
CAP
TERMINAL
GROOVE

- OPEN CAP ON CARRYING CASE AND LIFT THE FOUR LATCHES THAT ARE ON THE SIDES.
- LOWER CASE OVER TERMINAL BEING SURE THAT THE LIP ENGAGES THE GROOVE ON THE TERMINAL BASE.

STEP #4

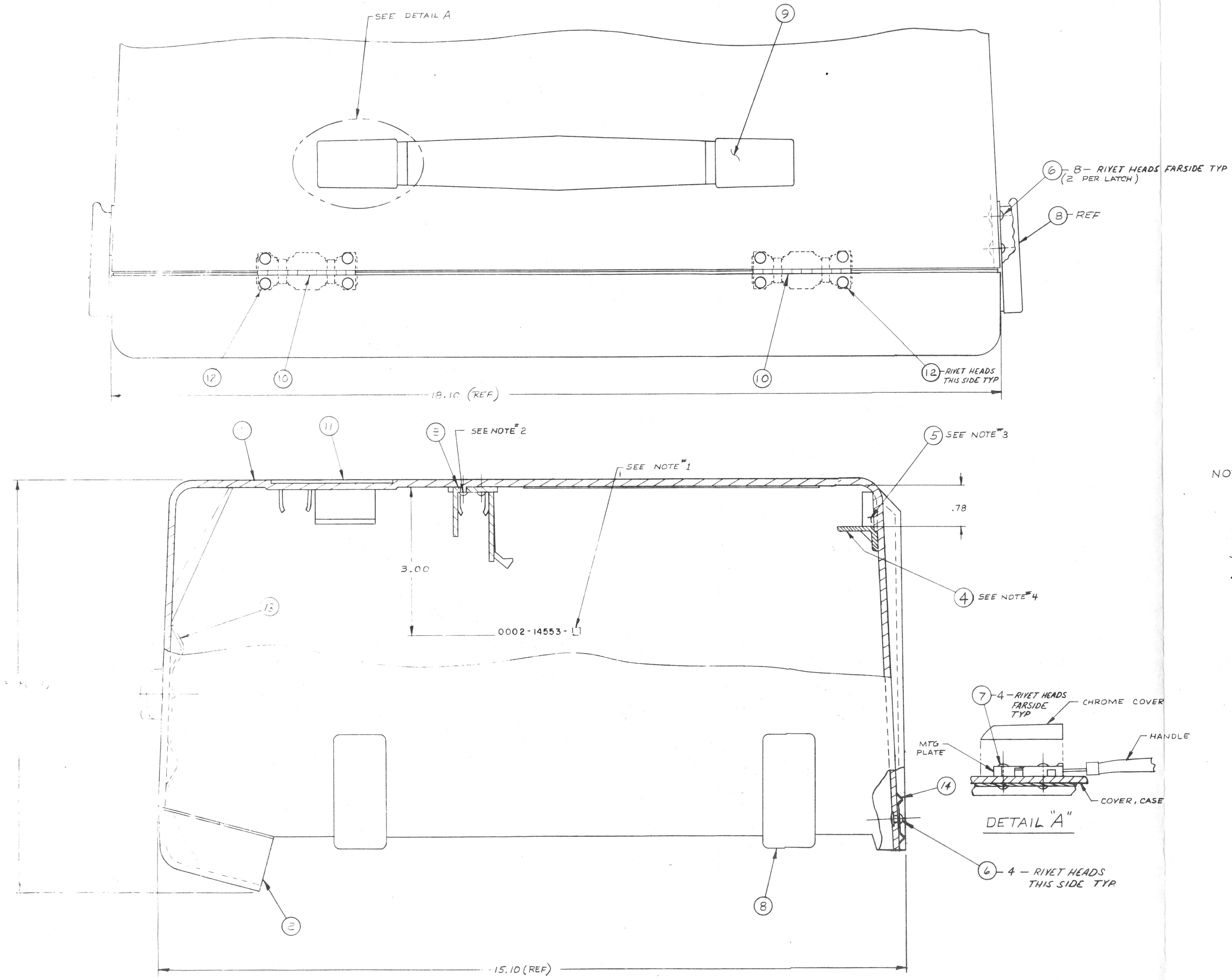


- LOCK THE LATCHES ON BOTH SIDES OF THE CASE IN THE GROOVES PROVIDED ON EACH SIDE AS SHOWN.
- CLOSE CAP OVER VENT HOLES TO PREVENT DUST AND FLUIDS FROM ENTERING WHILE IN TRANSIT.

NOTE:

1. THESE ARE INSTRUCTIONS TO PREVENT DAMAGE TO #3000 SERIES TERMINALS WHEN PORTABILITY IS NEEDED.

Figure 6-1. Computer Exploded View, Carrying Case and Housing (A1 and A3) (Sheet 1 of 7).


SEE DETAIL A
9
6 8 – RIVET HEADS FARSIDE TYP (2 PER LATCH)
8 REF
12
10
10
12 RIVET HEADS THIS SIDE TYP
18.10 (REF)
11
3 SEE NOTE# 2
SEE NOTE# 1
5 SEE NOTE# 3
.78
3.00
4 SEE NOTE# 4
0002-14553-
13
7 4 – RIVET HEADS FARSIDE TYP
CHROME COVER
HANDLE
MTG PLATE
14
COVER, CASE
DETAIL "A"
6 4 – RIVET HEADS THIS SIDE TYP
8
2
15.10 (REF)

NOTES.

1. MARK CDI PART NO. 0002-14553 WITH REVI[illegible] LETTER INDICATED ON DWG [illegible] HIGH USING [illegible] PERMANENT PAINT, TO INSIDE OF COVER.
2. HEAT STAKE ITEM# 3 TO ITEM# 1. (4 P[illegible] AND SOLVENT BOND AS SHOWN.
3. INSTALL ITEM# 5 TO ITEM# 1 [illegible] OTHER ASSEMBLIES COMPLETED.
4. SOLVENT BOND ITEM#4, AT LOCATION SHOWN.

Figure 6-1. Computer Exploded View, Carrying Case and Housing (A1 and A3) (Sheet 2 of 7).

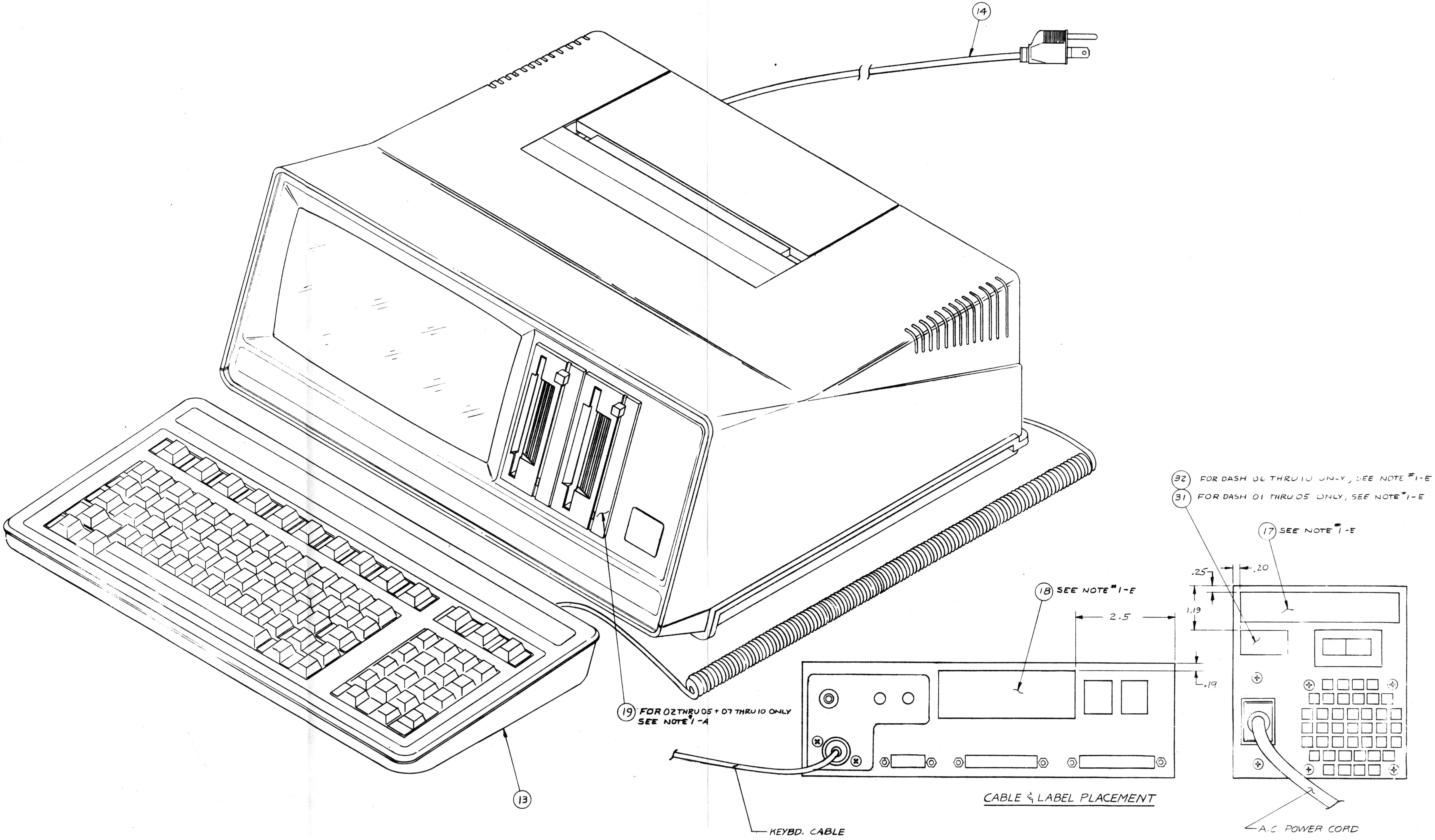

14
32 FOR DASH 06 THRU 10 ONLY, SEE NOTE #1-E
31 FOR DASH 01 THRU 05 ONLY, SEE NOTE #1-E
17 SEE NOTE #1-E
.25
.20
1.19
18 SEE NOTE #1-E
2.5
.19
19 FOR 02 THRU 05 + 07 THRU 10 ONLY SEE NOTE #1-A
13
CABLE & LABEL PLACEMENT
KEYBD. CABLE
A.C. POWER CORD

Figure 6-1. Computer Exploded View, Carrying Case and Housing (A1 and A3) (Sheet 3 of 7).

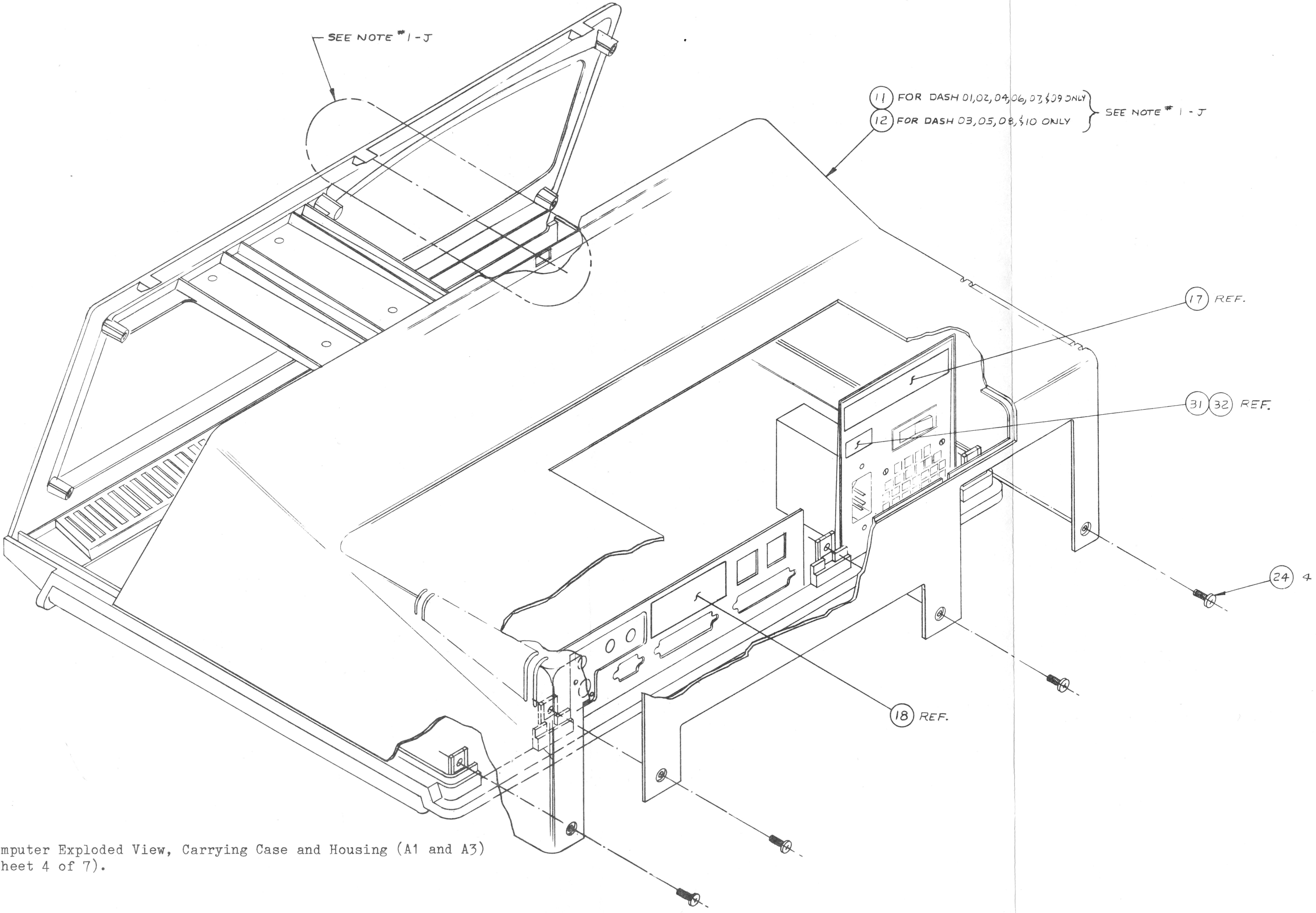

SEE NOTE # 1-J
11 FOR DASH 01,02,04,06,07,&09 ONLY
12 FOR DASH 03,05,08,&10 ONLY
SEE NOTE # 1-J
17 REF.
31 32 REF.
24 4
18 REF.

Figure 6-1. Computer Exploded View, Carrying Case and Housing (A1 and A3) (Sheet 4 of 7).

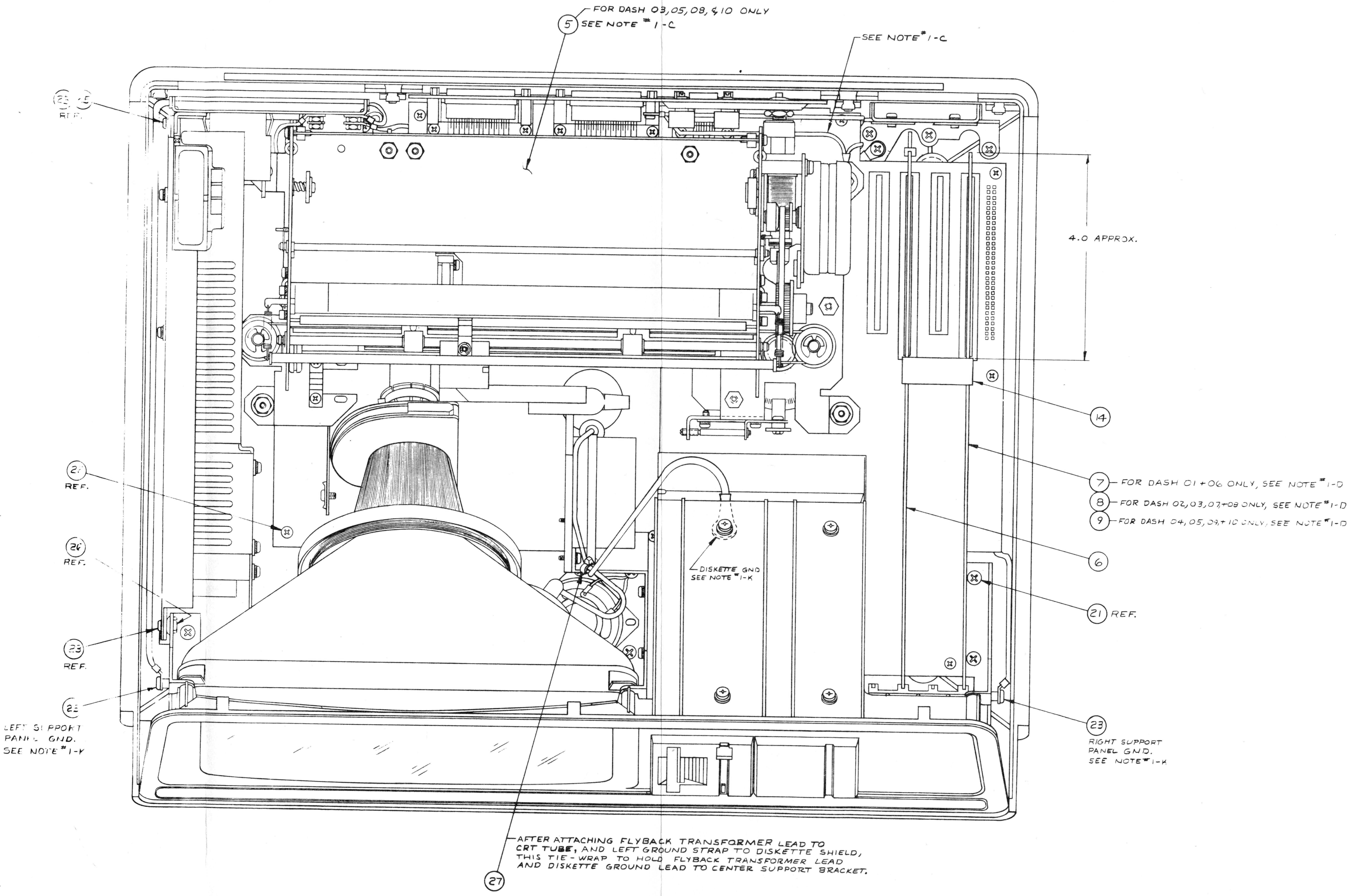
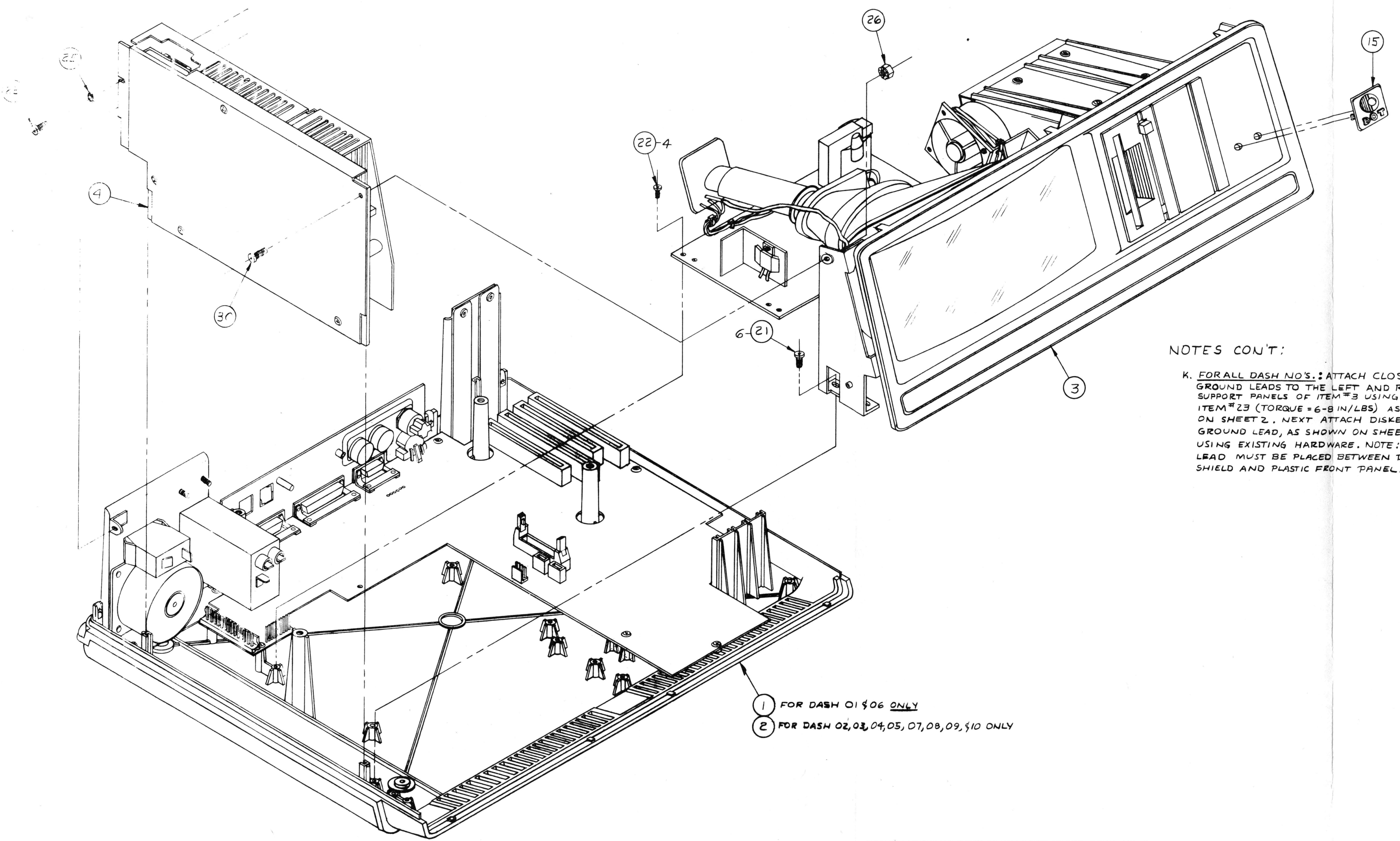

⑤ FOR DASH 03,05,08,&10 ONLY
SEE NOTE # 1-C
SEE NOTE # 1-C
23 25
REF.
4.0 APPROX.
⑭
⑦ FOR DASH 01+06 ONLY, SEE NOTE # 1-D
⑧ FOR DASH 02,03,07+08 ONLY, SEE NOTE # 1-D
⑨ FOR DASH 04,05,09,+10 ONLY, SEE NOTE # 1-D
⑥
REF.
26
REF.
DISKETTE GND
SEE NOTE # 1-K
㉑ REF.
23
REF.
LEFT SUPPORT
PANEL GND.
SEE NOTE # 1-K
㉓
RIGHT SUPPORT
PANEL GND.
SEE NOTE # 1-K
AFTER ATTACHING FLYBACK TRANSFORMER LEAD TO CRT TUBE, AND LEFT GROUND STRAP TO DISKETTE SHIELD, THIS TIE-WRAP TO HOLD FLYBACK TRANSFORMER LEAD AND DISKETTE GROUND LEAD TO CENTER SUPPORT BRACKET.
㉗

Figure 6-1. Computer Exploded View, Carrying Case and Housing (A1 and A3) (Sheet 5 of 7).



NOTES CON'T:

K. FOR ALL DASH NO'S.: ATTACH CLOSEST GROUND LEADS TO THE LEFT AND RIGHT SUPPORT PANELS OF ITEM #3 USING ITEM #23 (TORQUE = 6-8 IN/LBS) AS SHOWN ON SHEET 2. NEXT ATTACH DISKETTE GROUND LEAD, AS SHOWN ON SHEET #2, USING EXISTING HARDWARE. NOTE: THIS LEAD MUST BE PLACED BETWEEN DISKETTE SHIELD AND PLASTIC FRONT PANEL.

NOTES:

1. ASSEMBLE AS FOLLOWS:

A) FOR DASH 02 THRU 05 & 07 THRU 10 ONLY: INSTALL ITEM #19 (SEE SHEET 4) PER CC DWG. D0010-14549.

B) REMOVE (2) FRONT RUBBER FEET FROM APPLICABLE ITEM #1 OR #2 AND PLACE APPLICABLE ITEM #1 OR #2 ON A HARD FLAT SURFACE. SECURE BRACKETS (CENTER BRACKET FIRST) OF ITEM #3 TO APPLICABLE ITEM #1 OR #2, USING ITEM #21 (TORQUE = 6-8 IN/LBS) - 6 PLACES & ITEM #22 (TORQUE = 3-4 IN/LBS) - 4 PLACES (SEE SHEET 1), REASSEMBLE (2) RUBBER FEET. ATTACH (2) FLOPPY DISK DRIVE CABLES (PART OF ITEM #3) & ITEM #10 TO MOTHER BOARD, AS SHOWN PER SHEET #5.

C) ITEM #4 TO APPLICABLE ITEM #1 OR #2, USING (2) ITEM #23 (TORQUE 6-8 IN/LBS), (1) ITEM #25, (1) ITEM #30, AND (1) ITEM #26. ATTACH (2) CABLES AS SHOWN ON SHEET #5: POWER SUPPLY TO MOTHERBOARD AND FAN BRACKET ASSEMBLY TO POWER SUPPLY.
FOR DASH 03,05,08,&10 ONLY: ATTACH (2) CABLES AS SHOWN ON SHEET #5: PRINTER BOARD TO POWER SUPPLY AND PRINTER TO MOTHERBOARD. ATTACH PARTS OF ITEM #5 AS FOLLOWS: SHOCK MOUNT (TORQUE = 10-13 IN/LBS), PRINTER, WASHER, RIGHT GROUND STRAP LEAD TO NEAREST PRINTER BOSS, AND NUT (TORQUE = 10-13 IN/LBS) - 4 PLACES (SEE SHEET 2).
FOR DASH 01,02,04,06,07,&09 ONLY: ATTACH RIGHT GROUND STRAP TO NEAREST PRINTER BOSS USING ITEM (28) (TORQUE = 10-13 IN/LBS) AND ITEM (29) (SEE SHEET 2).

D) ITEM #6 AND #7, #8 OR #9 INTO RESPECTIVE GUIDES AND CONNECTORS. PRESS ITEM #16 ONTO ITEM #6 AND #7, #8 OR #9 (SEE SHEET #2).

E) APPLY ITEMS #17, #18, AND APPLICABLE ITEM #31 OR #32 AS SHOWN ON SHEET #4.

F) CONNECT ALL REMAINING PLUGS PER SHEET 5.

G) INSTALL ITEM #27, SEE SHEET 2.

H) PRESS ITEM #15 INTO ITEM #3 (SEE SHEET 1).

J) SECURE APPLICABLE ITEM #11 OR #12 TO ITEM #3 (INSURE THAT (3) BOSSES OF ITEM #3 ENGAGE), USING ITEM #24 (TORQUE = 6-8 IN/LBS) - 4 PLACES, SEE SHEET 3.

LEGEND

VARIATION	DESCRIPTION
14547-01 THRU 14547-05	110 V @ 2½ A = 275 W
14547-06 THRU 14547-10	220/240 V @ 1¼ A = 275 W

SEE SEPARATE PARTS LIST A0002-14547

Figure 6-1. Computer Exploded View, Carrying Case and Housing (A1 and A3) (Sheet 6 of 7).

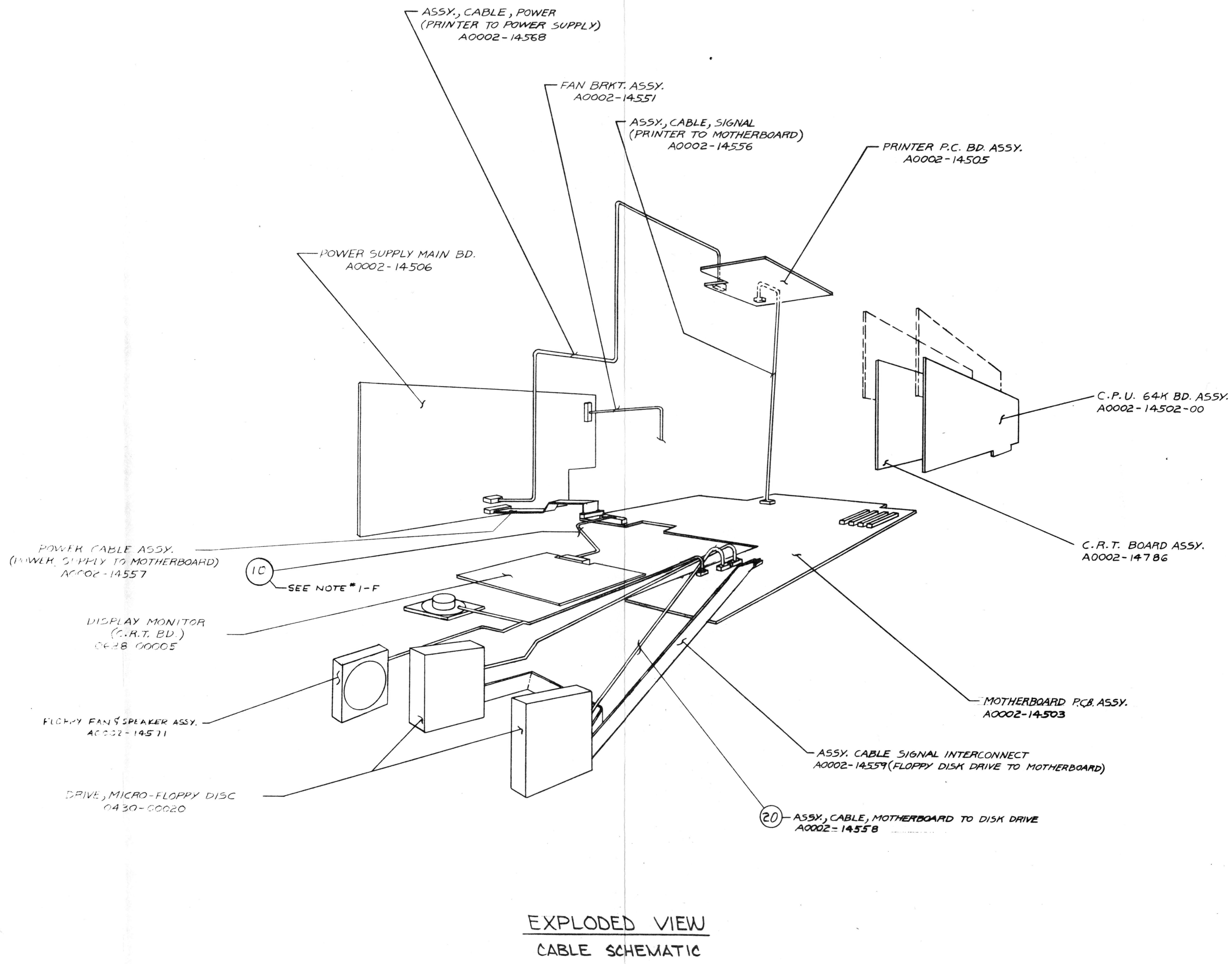
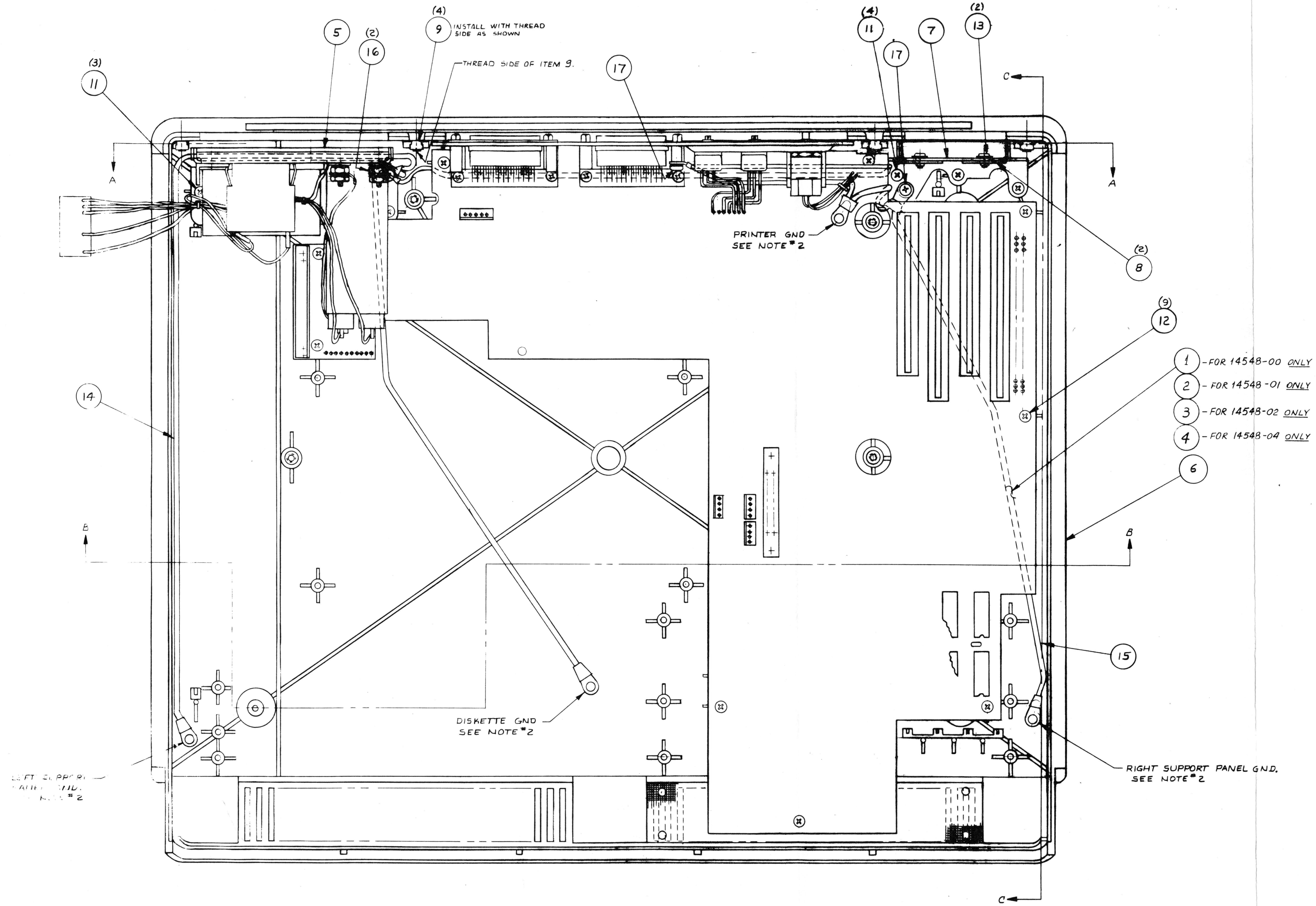

ASSY., CABLE, POWER
(PRINTER TO POWER SUPPLY)
A0002-14568
FAN BRKT. ASSY.
A0002-14551
ASSY., CABLE, SIGNAL
(PRINTER TO MOTHERBOARD)
A0002-14556
PRINTER P.C. BD. ASSY.
A0002-14505
POWER SUPPLY MAIN BD.
A0002-14506
C.P.U. 64K BD. ASSY.
A0002-14502-00
C.R.T. BOARD ASSY.
A0002-14786
POWER CABLE ASSY.
(POWER SUPPLY TO MOTHERBOARD)
A0002-14557
10
SEE NOTE # 1-F
DISPLAY MONITOR
(C.R.T. BD.)
0628 00005
FLOPPY FAN & SPEAKER ASSY.
A0002-14571
DRIVE, MICRO-FLOPPY DISC
0430-00020
MOTHERBOARD P.C.B. ASSY.
A0002-14503
ASSY. CABLE SIGNAL INTERCONNECT
A0002-14559 (FLOPPY DISK DRIVE TO MOTHERBOARD)
20
ASSY., CABLE, MOTHERBOARD TO DISK DRIVE
A0002-14558
EXPLODED VIEW
CABLE SCHEMATIC

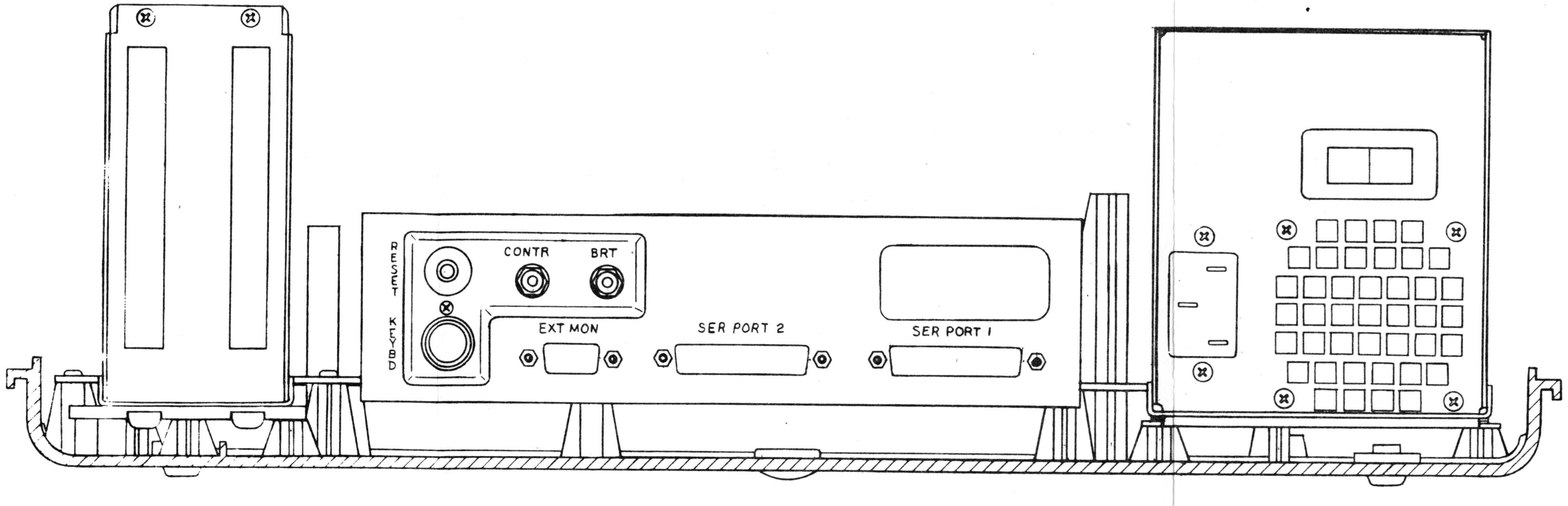
Figure 6-1. Computer Exploded View, Carrying Case and Housing (A1 and A3) (Sheet 7 of 7).


(3)
11
5
(2)
16
(4)
9
INSTALL WITH THREAD SIDE AS SHOWN
THREAD SIDE OF ITEM 9.
17
(4)
11
17
7
(2)
13
C
A
A
PRINTER GND
SEE NOTE #2
(2)
8
(9)
12
1 - FOR 14548-00 ONLY
2 - FOR 14548-01 ONLY
3 - FOR 14548-02 ONLY
4 - FOR 14548-04 ONLY
6
14
B
B
15
DISKETTE GND
SEE NOTE #2
RIGHT SUPPORT PANEL GND.
SEE NOTE #2
LEFT SUPPORT PANEL GND.
SEE NOTE #2
C

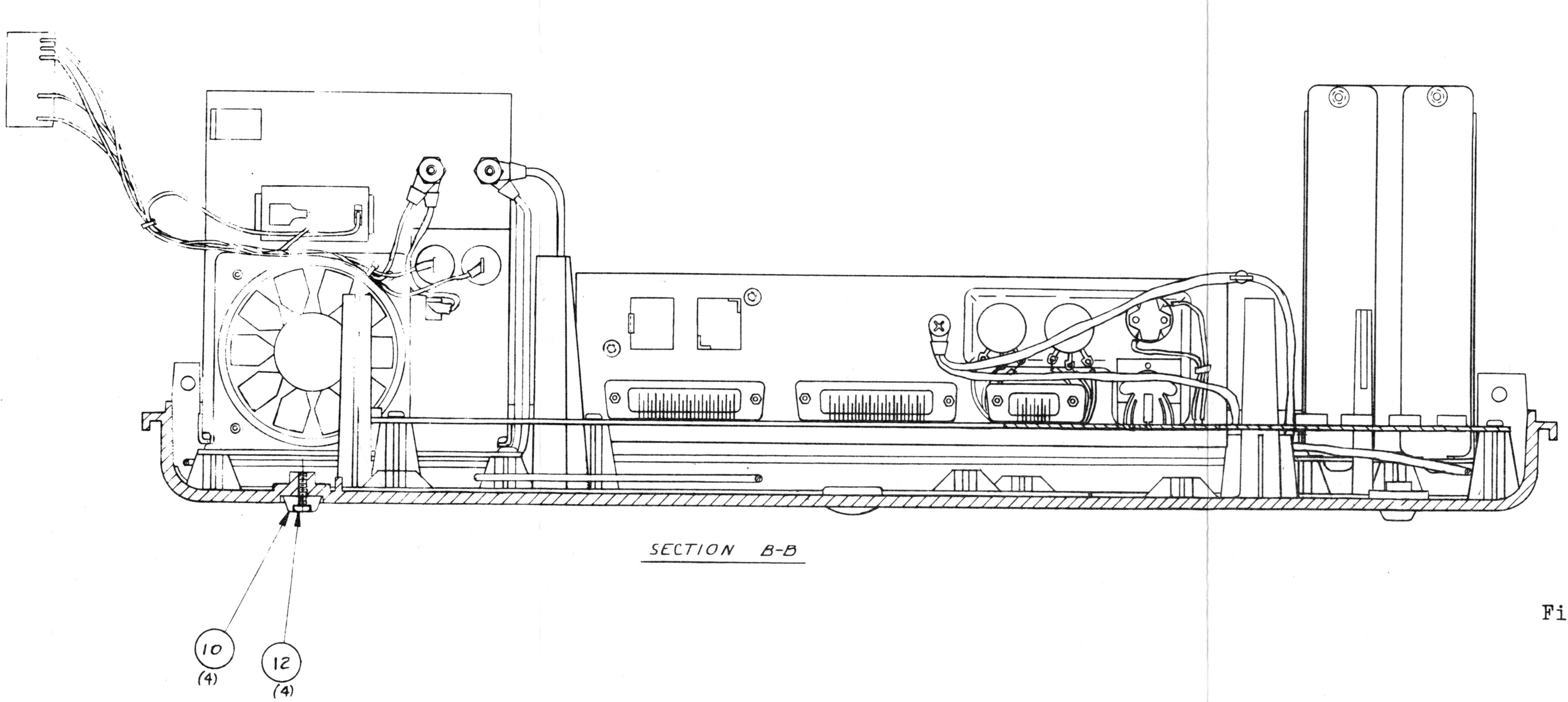
NOTES:

1. ITEMS MUST BE INSTALLED IN THE FOLLOWING ORDER:
   - A) ITEM 10 (BUMPER, MOLDED) - USING ITEM 12 (#4-20 X .38 LG SCR)
   - B) ITEM 14 (GROUND STRAP, LEFT) - USING ITEM #16 (#6-32 KEP NUT).
   - C) ITEM 5 (FAN BRACKET ASSY) - USING ITEM 11 (#6-19 X .38 LG SCR).
   - D) ITEM 7 (OPTION BOARD BRK'T) - USING ITEM 11 (#6-19 X .38 LG SCR).
   - E) ITEM 8 (OPTION BOARD PLATE) - USING ITEM 13 (#4-40 X .25 LG SCR).
   - F) ITEM #15 (GROUND STRAP, RIGHT) - USING ITEM 16 (#6-32 KEP NUT).
   - G) ITEM 1, 2, 3 OR 4 AS APPLICABLE (REAR PANEL ASSY) - USING ITEM 12 (#4-20 X .38 LG SCR)
   - H) ITEM 9 (FASTENER, SPEED NUT) - INSTALL AS SHOWN.
2. AFTER ASSY IS COMPLETE, THESE RING TERMINALS (CHASSIS GROUND), SHOULD REMAIN LOOSE AND BE POSITIONED APPROXIMATLY AS SHOWN. FOR FINAL LOCATION AND ATTACHMENT HARDWARE SEE: "STANDARD MECHANICAL ASSEMBLY 3000" DWG. NO. DOC10-14547.

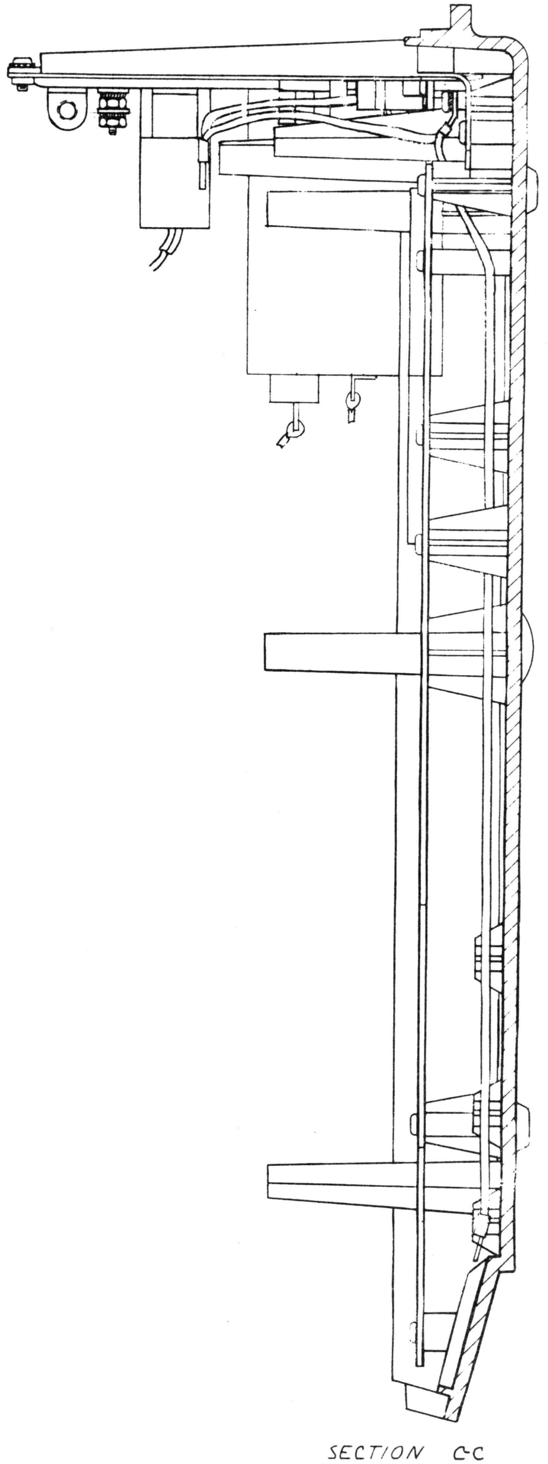
Figure 6-2. Base Cabinet Assembly (Sheet 1 of 2).


RESET
KEYBD
CONTR
BRT
EXT MON
SER PORT 2
SER PORT 1

SECTION A-A (ROTATED 180°)



SECTION B-B



SECTION C-C

Figure 6-2. Base Cabinet Assembly (Sheet 2 of 2).

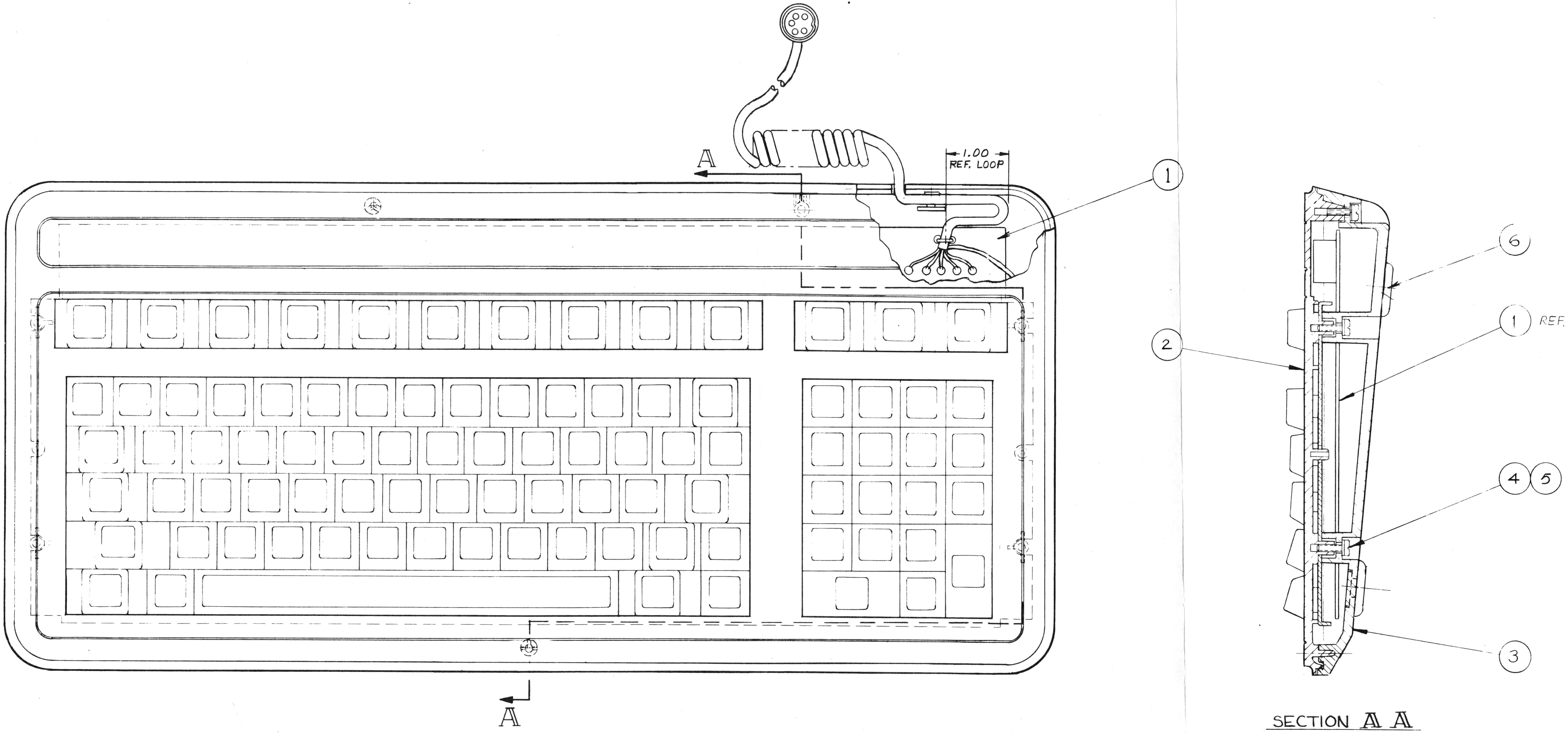
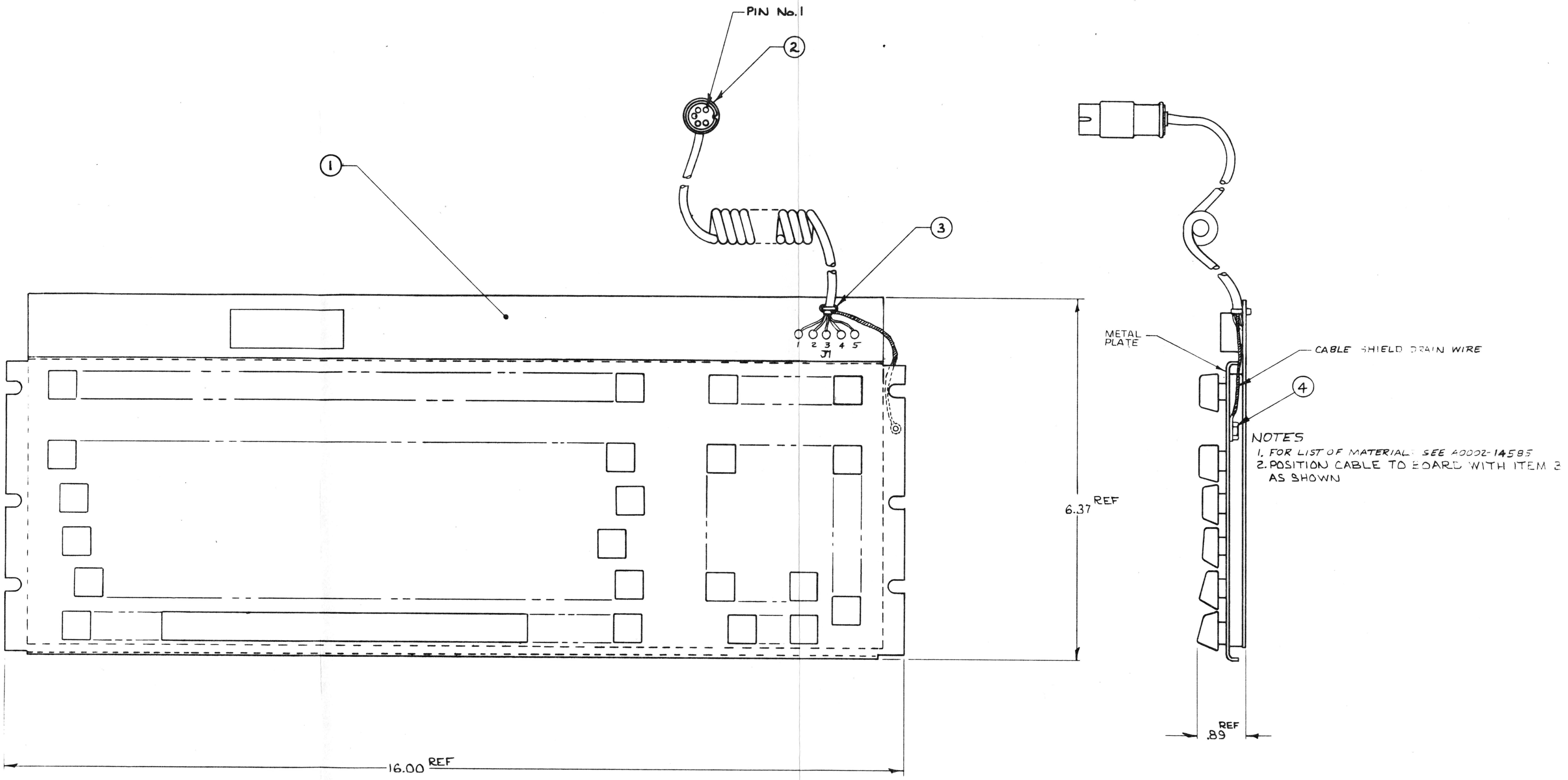

1.00
REF. LOOP
A
A
1
6
1 REF.
2
4
5
3
SECTION A A

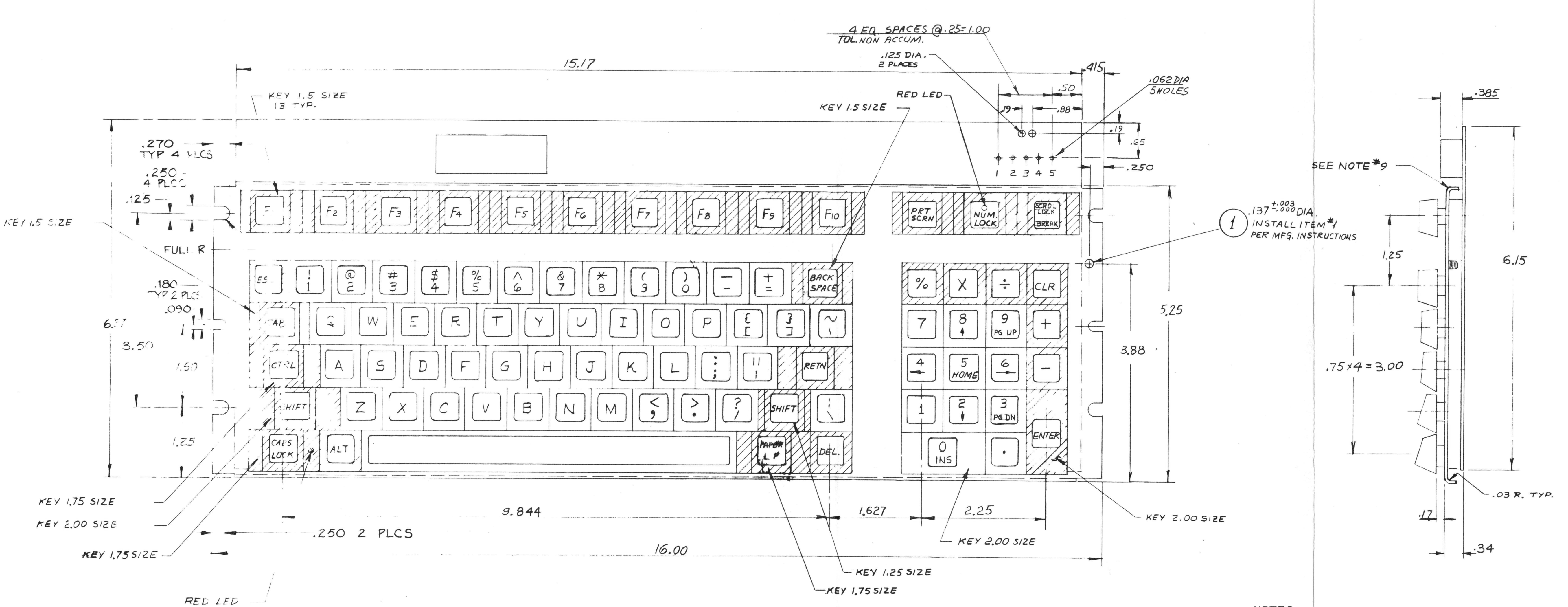
Figure 6-3. Keyboard Assembly (A2) Parts Location and Schematic Diagrams. (Sheet 1 of 6).


PIN No. 1
②
①
③
1 2 3 4 5
J1
METAL PLATE
CABLE SHIELD DRAIN WIRE
④
NOTES
1. FOR LIST OF MATERIAL: SEE A0002-14585
2. POSITION CABLE TO BOARD WITH ITEM 3 AS SHOWN
6.37 REF
.89 REF
16.00 REF

WIRING TABLE

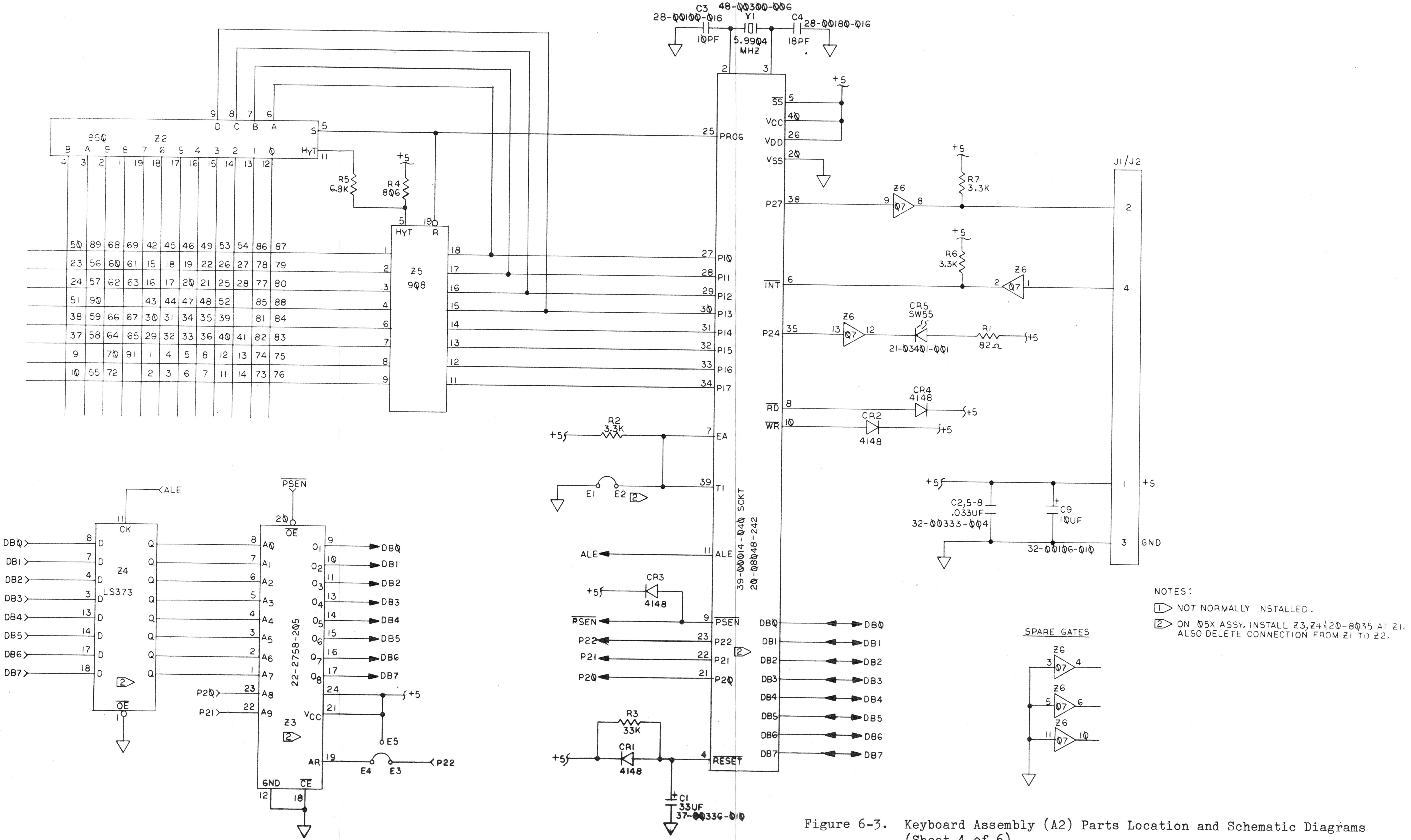
FROM			TO		ITEM 1 -J1
ITEM No	PIN No	WIRE COLOR	ITEM No	STATION No.	REFERENCE DESIGNATION
2	1	BLACK	1	J1-4	KYBD OUT
↕	2	RED	↕	↕ -2	KYBD IN
	3	WHT		-1	+5 VDC
	4	GRN		-3	GND
	5	YEL		-5	$\overline{\text{KYBD RESET}}$
2	—	SHIELD	1	METAL PLATE	—

Figure 6-3. Keyboard Assembly (A2) Parts Location and Schematic Diagrams. (Sheet 2 of 6).


4 EQ. SPACES @ .25=1.00
TOL. NON ACCUM.
.125 DIA.
2 PLACES
15.17
.415
.062 DIA
5 HOLES
RED LED
KEY 1.5 SIZE
KEY 1.5 SIZE
13 TYP.
.50
.19
.88
.19
.65
.250
1 2 3 4 5
.270
TYP 4 PLCS
.250
4 PLCS
.125
KEY 1.5 SIZE
FULL R
.180
TYP 2 PLCS
.090
6.37
3.50
1.50
1.25
F1 F2 F3 F4 F5 F6 F7 F8 F9 F10
PRT SCRN
NUM. LOCK
SCRO. LOCK BREAK
ESC
BACK SPACE
TAB
CTRL
RETN
SHIFT
SHIFT
CAPS LOCK
ALT
PAPER LF
DEL.
CLR
HOME
PG UP
PG DN
INS
ENTER
5.25
3.88
6.15
1
.137 +.003 -.000 DIA.
INSTALL ITEM #1
PER MFG. INSTRUCTIONS
SEE NOTE #9
.385
1.25
.75×4=3.00
.03 R. TYP.
.17
.34
KEY 1.75 SIZE
KEY 2.00 SIZE
KEY 1.75 SIZE
9.844
1.627
2.25
.250 2 PLCS
16.00
KEY 2.00 SIZE
KEY 2.00 SIZE
KEY 1.25 SIZE
KEY 1.75 SIZE
RED LED

NOTES
1. KEYTOP STYLE – CYLINDRICAL DISH SCULPTURED.
2. ALL KEYTOPS TO HAVE MATTE TOPS AND SEMIGLOSS SIDES.
3. ALL KEYTOPS TO BE DOUBLE SHOT MOLDED.
4. ALL UNSHADED KEYTOPS SHALL BE CYCOLAC, COLOR: FIELDSTONE #3640 CLASS C.
5. ALL SHADED KEYTOPS SHALL BE CYCOLAC COLOR: GRAY BEACH #30350 CLASS B.
6 KEYTOP LEGEND COLOR, FOR ALL KEYS, SHALL BE BLACK.
7. KEYTOP LEGEND STYLE, FOR ALL KEYS, SHALL BE GORTON NORMAL MODIFIED, IN THE FOLLOWING SIZES:
.187 HIGH, .171 HIGH, AND .100 HIGH
8 KEYTOP LEGEND LOCATIONS ARE TO BE CENTERED ON KEYTOPS AS SHOWN.
9. PLATE MAT'L: 16 GA. (0598) C.R.S. C1020, FINISH [illegible] ZINC PLATE, YELLOW CHROMATE PER CDI SPEC# A0006-146[illegible]8.
10. THIS DRAWING TO BE USED IN CONJUNCTION WITH SPECIFICATION #A0006-14500 AT ALL TIMES.

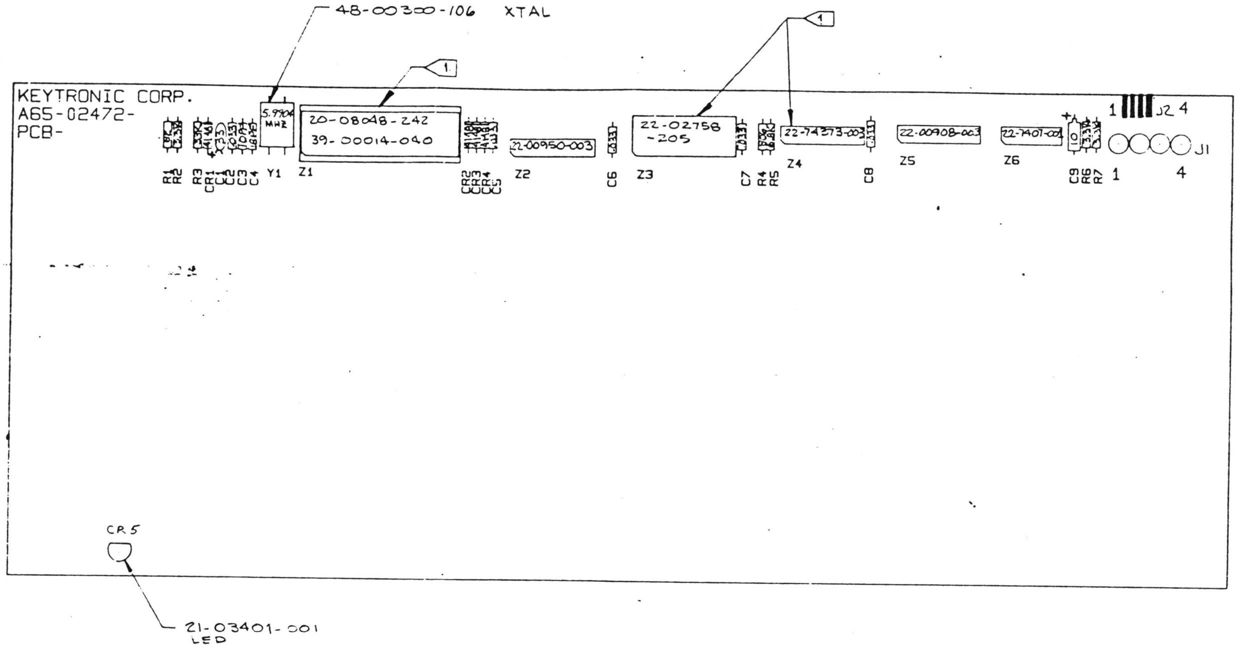
Figure 6-3. Keyboard Assembly (A2) Parts Location and Schematic Diagrams (Sheet 3 of 6).


C3
28-00100-016
10PF
48-00300-006
Y1
5.9904 MHZ
C4
28-00180-016
18PF
850
Z2
D C B A
S
HYT
B A 9 8 7 6 5 4 3 2 1 0
R5 6.8K
R4 806
+5
Z5
908
HYT
R
PROG
SS
VCC
VDD
VSS
P10
P11
P12
P13
P14
P15
P16
P17
EA
T1
ALE
PSEN
P22
P21
P20
RESET
DB0
DB1
DB2
DB3
DB4
DB5
DB6
DB7
39-00014-040 SCKT
20-08048-242
P27
INT
P24
RD
WR
Z6
R7 3.3K
R6 3.3K
CR5
SW55
21-03401-001
R1
82Ω
CR4
4148
CR2
4148
J1/J2
+5
GND
C2,5-8
.033UF
32-00333-004
C9
10UF
32-00106-010
R2
3.3K
E1
E2
CR3
4148
R3
33K
CR1
4148
C1
33UF
37-00336-010
ALE
CK
Z4
LS373
D
Q
OE
PSEN
OE
A0 A1 A2 A3 A4 A5 A6 A7 A8 A9
O1 O2 O3 O4 O5 O6 O7 O8
22-2758-205
Z3
VCC
E5
AR
E4
E3
P22
GND
CE
SPARE GATES
Z6
07

NOTES:

1. NOT NORMALLY INSTALLED.
2. ON 05X ASSY. INSTALL Z3,Z4 & 20-8035 AT Z1. ALSO DELETE CONNECTION FROM Z1 TO Z2.

Figure 6-3. Keyboard Assembly (A2) Parts Location and Schematic Diagrams (Sheet 4 of 6).


48-00300-106 XTAL
1
1
KEYTRONIC CORP.
A65-02472-
PCB-
5.9904 MHZ
20-08048-242
39-00014-040
22-00950-003
22-02758
-205
22-74373-003
22-00908-003
22-7407-001
R1
R2
R3
CR1
C1
C2
C3
C4
Y1
Z1
CR2
CR3
CR4
C5
Z2
C6
Z3
C7
R4
R5
Z4
C8
Z5
Z6
C9
R6
R7
1
J2
4
J1
1
4
CR5
21-03401-001
LED

-001 & -051 ASSY

1. ON -05X ASSY. INSTALL Z3 & Z4 AND 20-08035-000 AT Z1.

Figure 6-3. Keyboard Assembly (A2) Parts Location and Schematic Diagrams (Sheet 5 of 6).

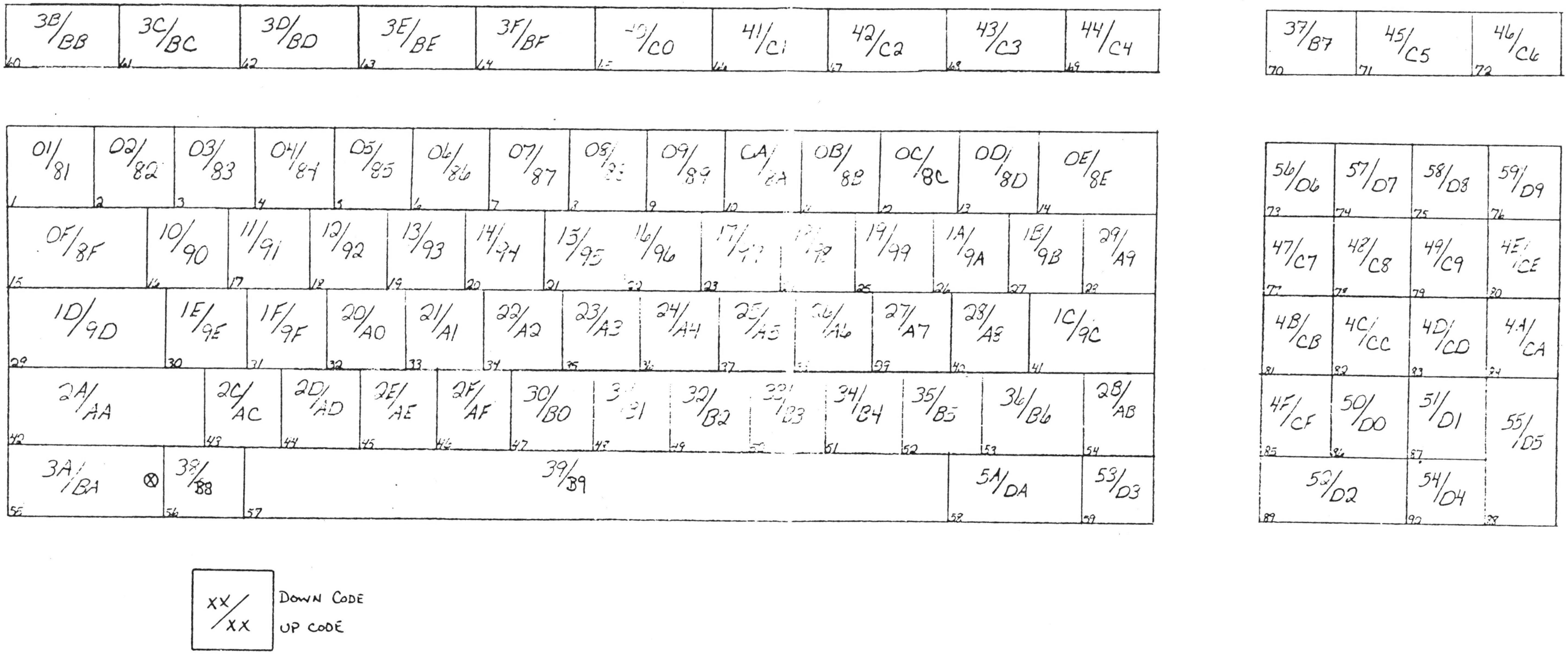
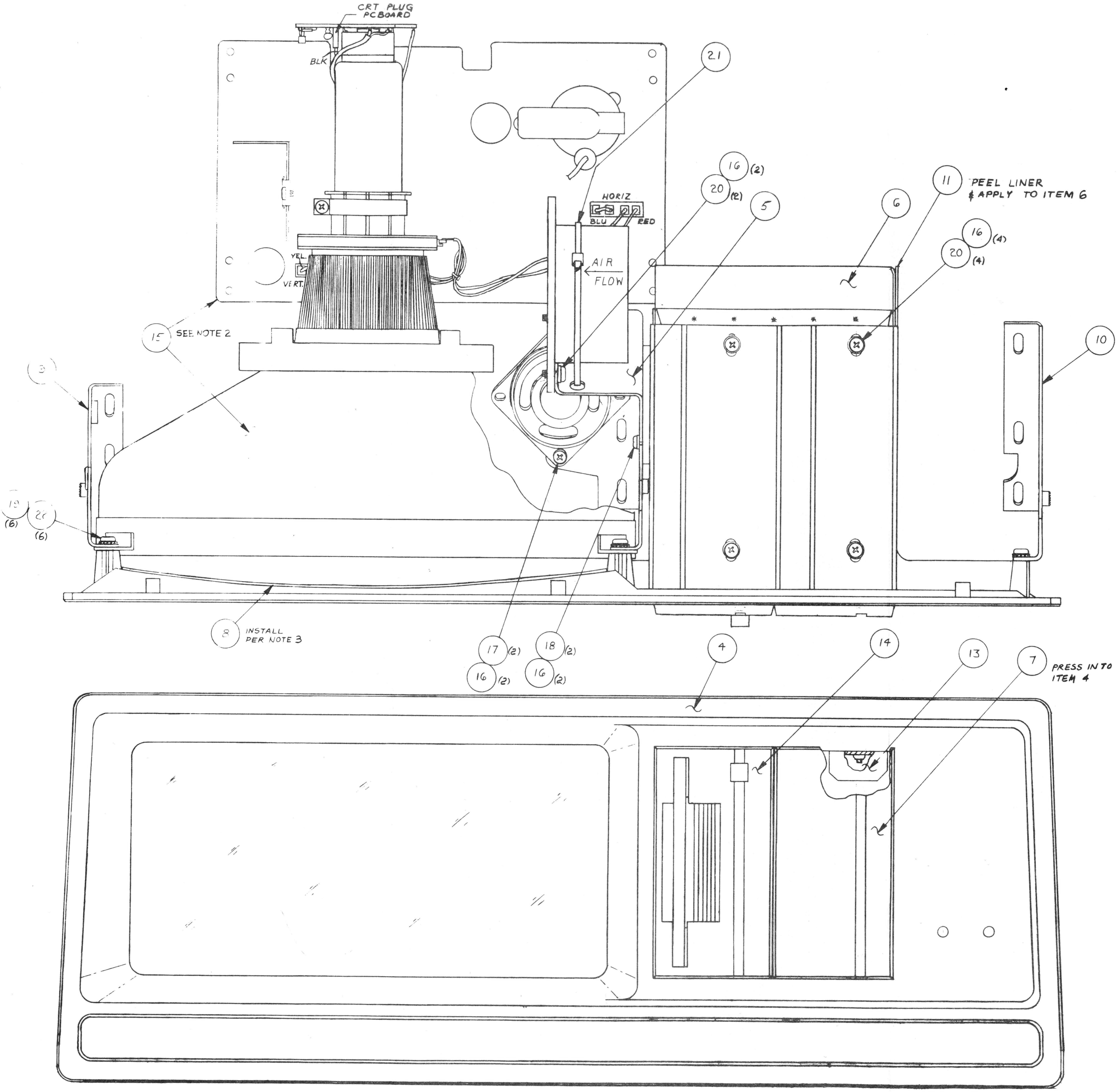
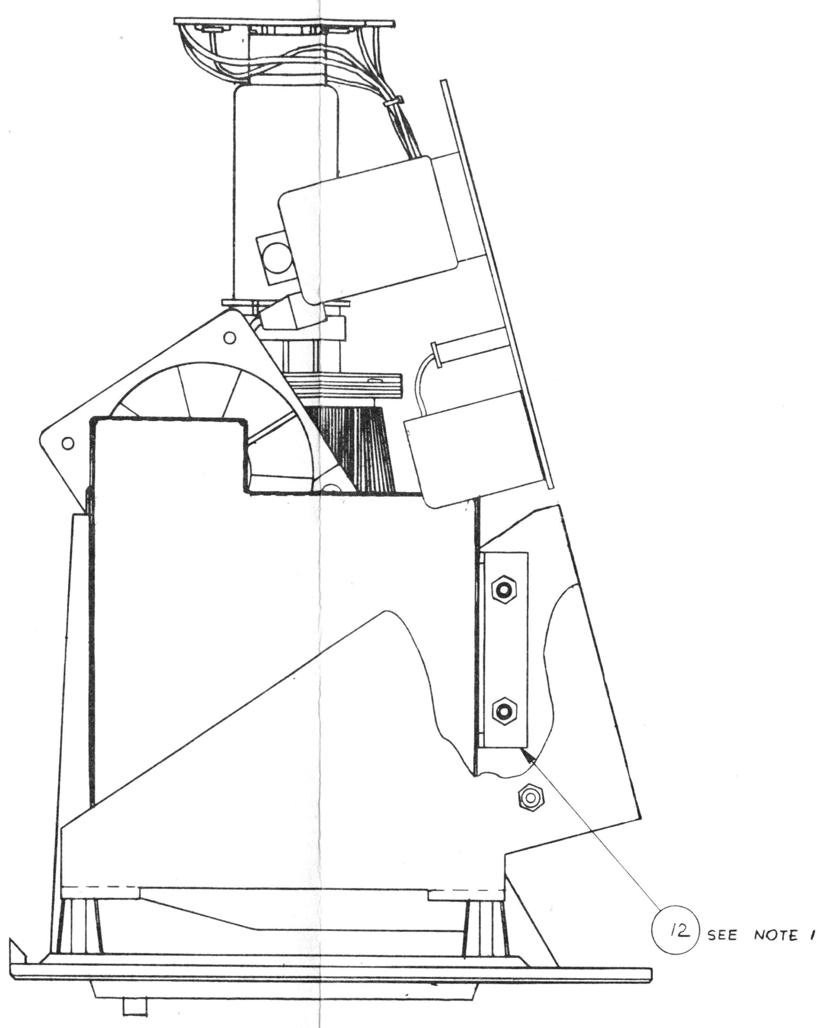

3B/BB
3C/BC
3D/BD
3E/BE
3F/BF
40/C0
41/C1
42/C2
43/C3
44/C4
37/B7
45/C5
46/C6
01/81
02/82
03/83
04/84
05/85
06/86
07/87
08/88
09/89
0A/8A
0B/8B
0C/8C
0D/8D
0E/8E
0F/8F
10/90
11/91
12/92
13/93
14/94
15/95
16/96
17/97
18/98
19/99
1A/9A
1B/9B
29/A9
1D/9D
1E/9E
1F/9F
20/A0
21/A1
22/A2
23/A3
24/A4
25/A5
26/A6
27/A7
28/A8
1C/9C
2A/AA
2C/AC
2D/AD
2E/AE
2F/AF
30/B0
31/B1
32/B2
33/B3
34/B4
35/B5
36/B6
2B/AB
3A/BA
⊗
38/B8
39/B9
5A/DA
53/D3
56/D6
57/D7
58/D8
59/D9
47/C7
48/C8
49/C9
4E/CE
4B/CB
4C/CC
4D/CD
4A/CA
4F/CF
50/D0
51/D1
55/D5
52/D2
54/D4
XX/XX
DOWN CODE
UP CODE

Figure 6-3. Keyboard Assembly (A2) Parts Location and Schematic Diagrams (Sheet 6 of 6).

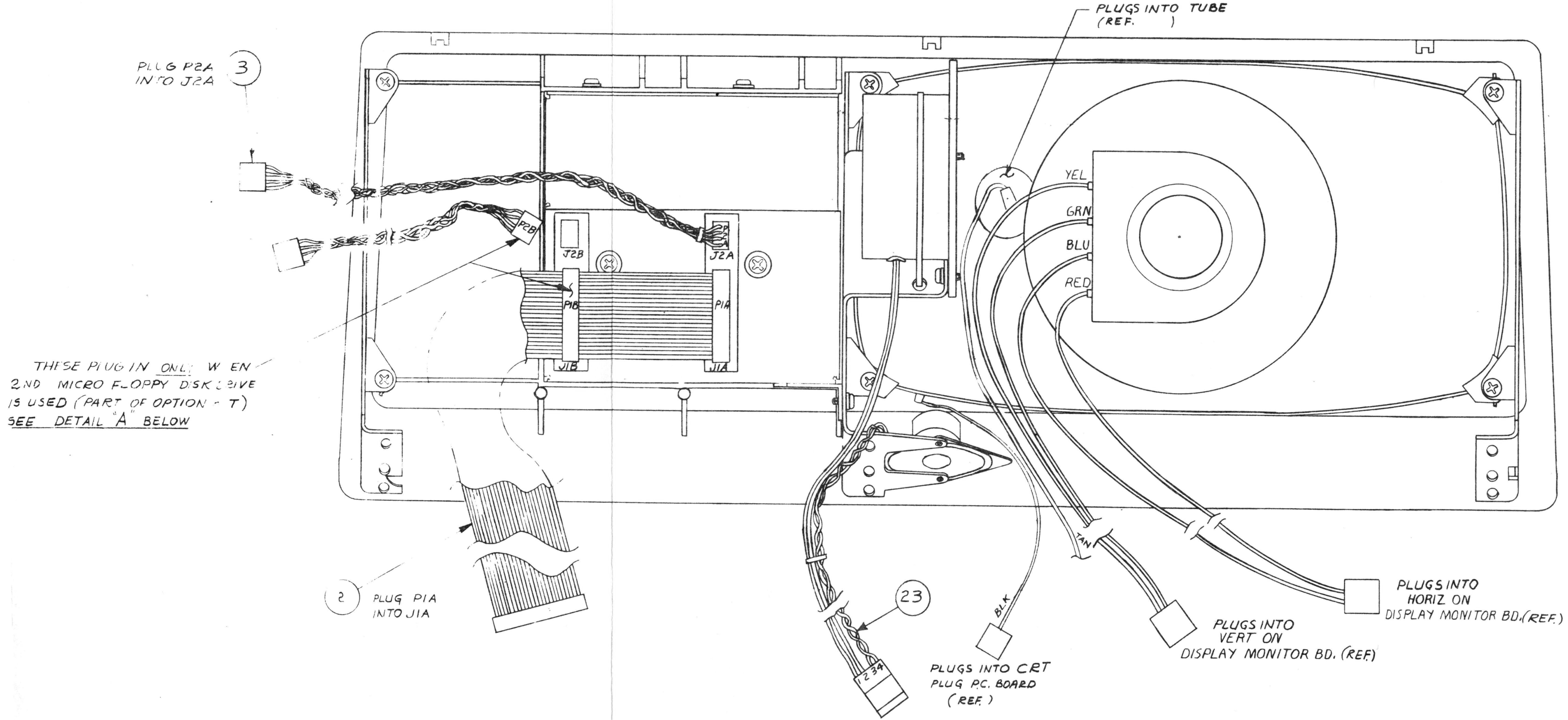

CRT PLUG
PCBOARD
BLK
YEL
VERT.
HORIZ
BLU
RED
AIR
FLOW
21
16 (2)
20 (2)
5
6
11 PEEL LINER & APPLY TO ITEM 6
16 (4)
20 (4)
10
15 SEE NOTE 2
9
19 (6)
20 (6)
8 INSTALL PER NOTE 3
17 (2)
16 (2)
18 (2)
16 (2)
4
14
13
7 PRESS INTO ITEM 4


12 SEE NOTE 1

NOTES:

1. AFTER INSTALLING MICRO FLOPPY DISK DRIVE, ITEM 14, MICRO FLOPPY SHIELD, ITEM 6 AND APPROPRIATE HARDWARE (ITEMS 20 AND 16) PRESS MICRO FLOPPY SUPPORT, ITEM 12 AGAINST MICRO FLOPPY SHIELD, ITEM 6 AND TIGHTEN SCREWS, ITEM 18
2. ASSEMBLE DISPLAY MONITOR, ITEM 15 WITH MOUNTING TABS BETWEEN SUPPORTS, ITEMS 9 & 5 & FRONT PANEL, ITEM 4 AS SHOWN.
3. FILTER, ITEM 8 SHOULD BE INSTALLED IN PLACE USING THIN STRIPS OF TAPE, ITEM 24 AROUND FOUR SIDES OF FRONT PANEL OPENING, ITEM 4 ON REAR SURFACE TO INSURE NON-SLIPPAGE

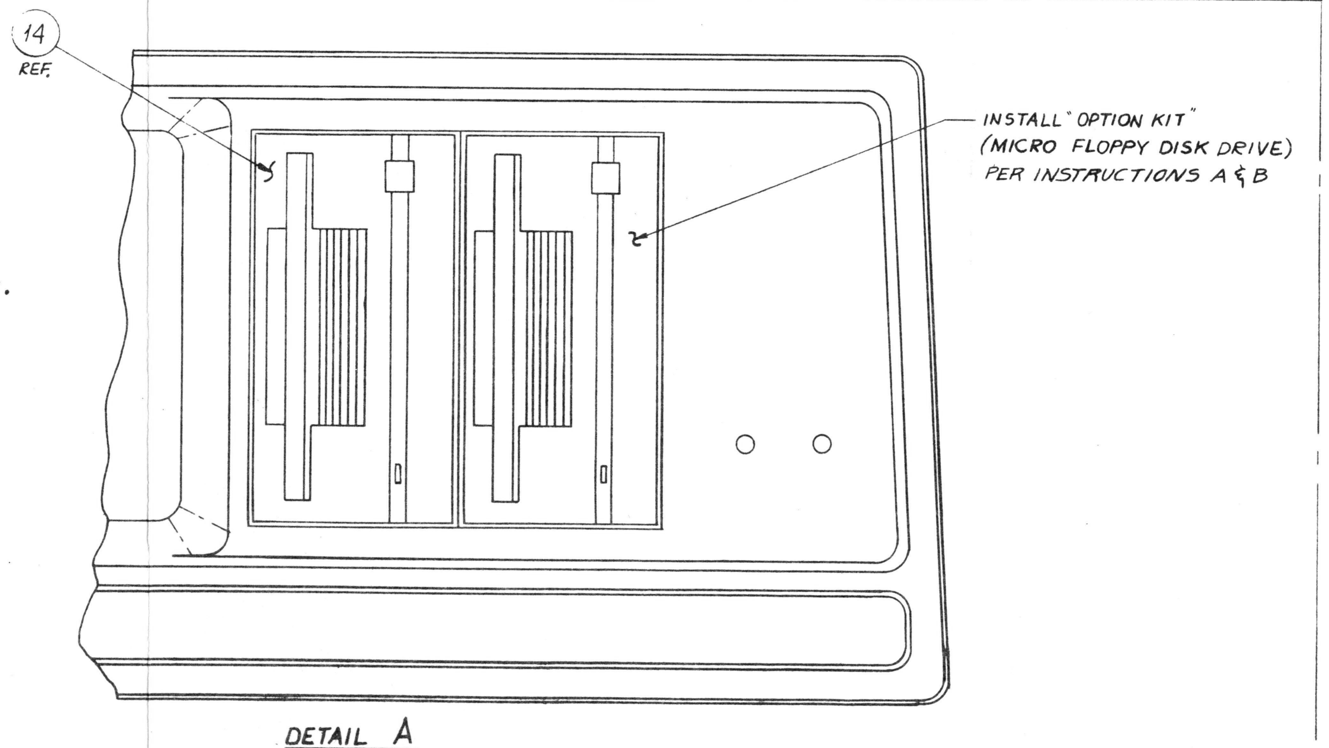
Figure 6-4. Front Panel Assembly (A4) Parts Location and Schematic Diagrams (Sheet 1 of 3).


PLUGS INTO TUBE (REF.)
PLUG P2A INTO J2A
3
P2B
J2B
J2A
P1B
P1A
J1B
J1A
YEL
GRN
BLU
RED
THESE PLUG IN ONLY WHEN 2ND MICRO FLOPPY DISK DRIVE IS USED (PART OF OPTION KIT) SEE DETAIL "A" BELOW
2
PLUG P1A INTO J1A
23
TAN
BLK
PLUGS INTO CRT PLUG P.C. BOARD (REF.)
PLUGS INTO VERT ON DISPLAY MONITOR BD. (REF.)
PLUGS INTO HORIZ ON DISPLAY MONITOR BD. (REF.)

INSTRUCTIONS: (FOR OPTION KIT INSTALLATION ONLY)

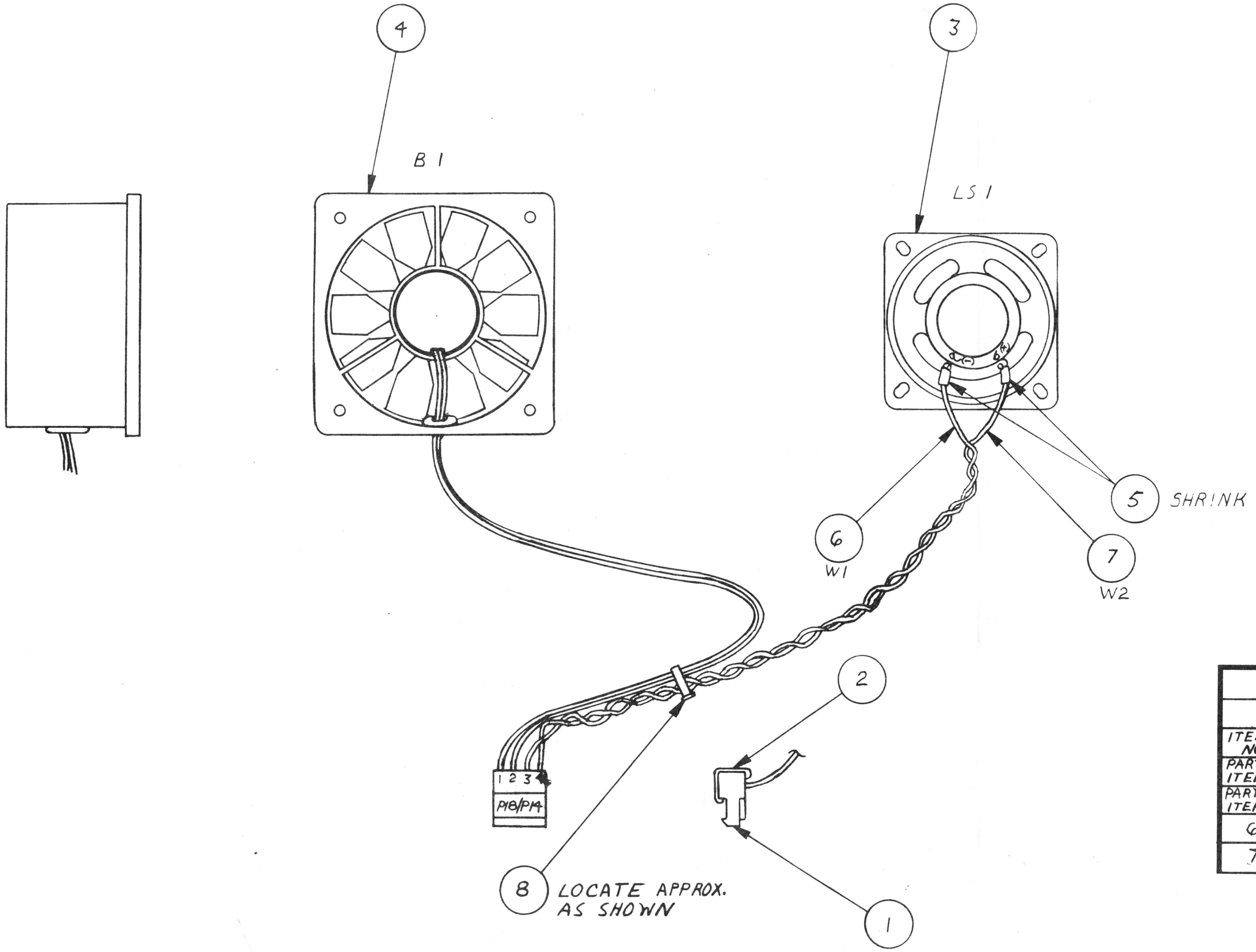
A. BEFORE INSTALLING OPTION KIT, REMOVE & DISCARD EXISTING DISK FILLER PANEL, ITEM 7 & SHIELD RETAINER, ITEM 13 (RETAIN SCREWS ITEM 20 & WASHERS, ITEM 16).
MOUNT MICRO FLOPPY DISK (PART OF OPTION KIT) USING EXISTING SCREWS, ITEM 20 & WASHERS, ITEM 16.

B. PLUG P1B (PART OF ITEM 2) INTO J1B (SEE ABOVE) & PLUG P2B (PART OF OPTION KIT) INTO J2B (SEE ABOVE).


14
REF.
INSTALL "OPTION KIT" (MICRO FLOPPY DISK DRIVE) PER INSTRUCTIONS A & B

DETAIL A
(USED ONLY WHEN OPTION KIT IS PART OF ASSY)

Figure 6-4. Front Panel Assembly (A4) Parts Location and Schematic Diagrams (Sheet 2 of 3).

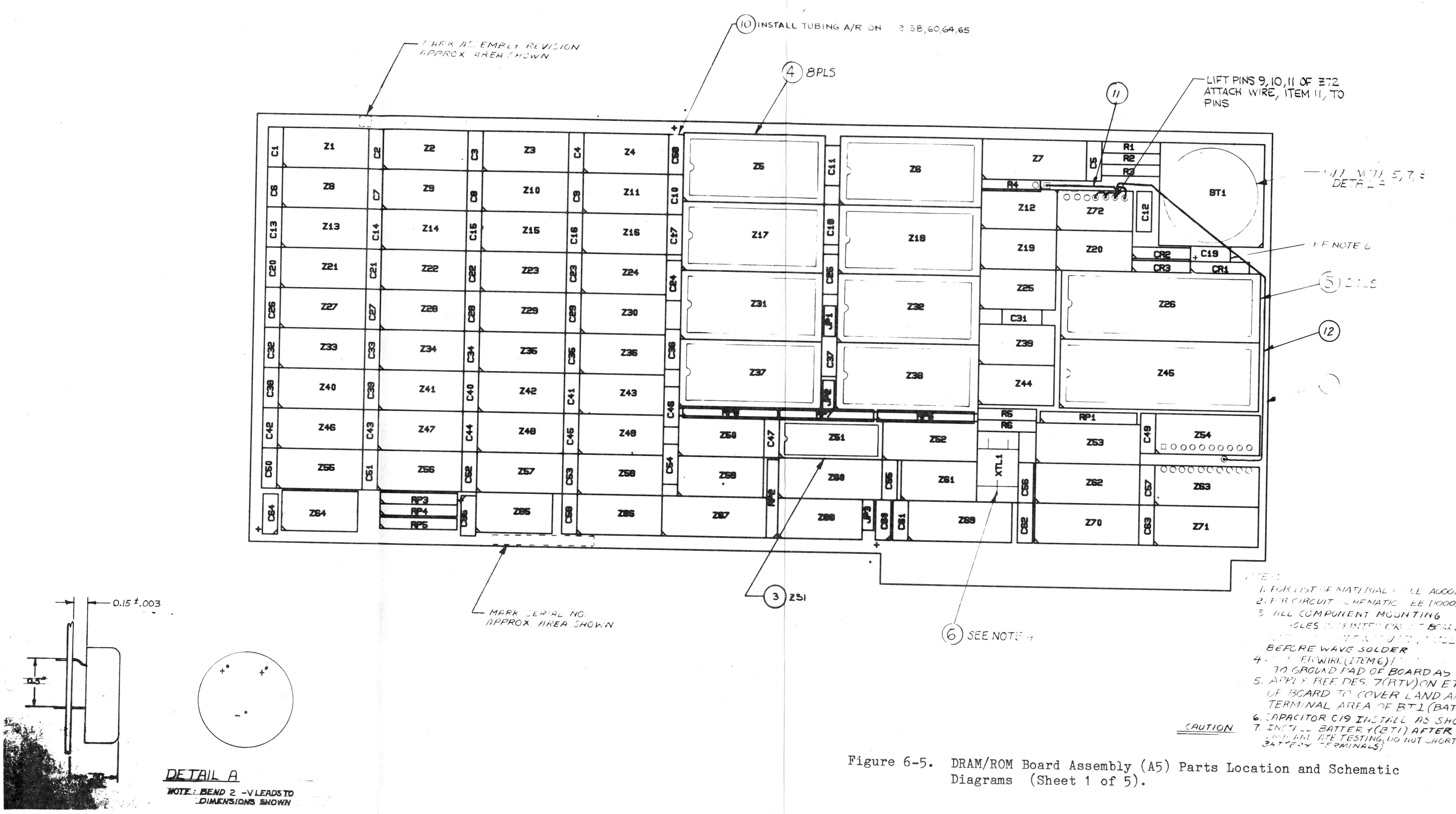

4
B1
3
LS1
5 SHRINK
6
W1
7
W2
1 2 3 4
P18/P14
2
8 LOCATE APPROX. AS SHOWN
1

NOTES:
1. WIRE COMPONENTS PER WIRE RUN LIST.

WIRE RUN LIST

WIRE					FROM			TO			NOTE
ITEM NO.	REF DES	AWG	COLOR	LENGTH ±.5"	REF DES	TERM. WITH	INSUL WITH	REF DES	TERM WITH	INSUL WITH	
PART OF ITEM 4	B1-W1 (RED)	24 REF	—	TRIM TO 4.5	B1	—	—	P18/~~P14~~-1	CRIMP	—	—
PART OF ITEM 4	B1-W2 (BLACK)	24 REF	—	TRIM TO 4.5	B1	—	—	P18/P14-2	CRIMP	—	—
6	W1	24	BLK	5.5	LS1-a	SOLDER	ITEM 5	~~P18~~/P14-3	CRIMP	—	TWISTED PAIR
7	W2	24	WHT	5.5	LS1-b	SOLDER	ITEM 5	~~P18/P14~~-4	CRIMP	—	

Figure 6-4. Front Panel Assembly (A4) Parts Location and Schematic Diagrams (Sheet 3 of 3).



(10) INSTALL TUBING A/R ON 58,60,64,65
MARK ASSEMBLY REVISION APPROX AREA SHOWN
(4) 8PLS
(11)
LIFT PINS 9,10,11 OF Z72 ATTACH WIRE, ITEM 11, TO PINS
SEE NOTE 5,7,8 DETAIL A
SEE NOTE 6
(5)
(12)
(3) Z51
(6) SEE NOTE 4
MARK SERIAL NO. APPROX. AREA SHOWN
Z1
Z2
Z3
Z4
Z5
Z6
Z7
Z8
Z9
Z10
Z11
Z12
Z13
Z14
Z15
Z16
Z17
Z18
Z19
Z20
Z21
Z22
Z23
Z24
Z25
Z26
Z27
Z28
Z29
Z30
Z31
Z32
Z33
Z34
Z35
Z36
Z37
Z38
Z39
Z40
Z41
Z42
Z43
Z44
Z45
Z46
Z47
Z48
Z49
Z50
Z51
Z52
Z53
Z54
Z55
Z56
Z57
Z58
Z59
Z60
Z61
Z62
Z63
Z64
Z65
Z66
Z67
Z68
Z69
Z70
Z71
Z72
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13
C14
C15
C16
C17
C18
C19
C20
C21
C22
C23
C24
C25
C26
C27
C28
C29
C30
C31
C32
C33
C34
C35
C36
C37
C38
C39
C40
C41
C42
C43
C44
C45
C46
C47
C48
C49
C50
C51
C52
C53
C54
C55
C56
C57
C58
C59
C60
C61
C62
C63
C64
R1
R2
R3
R4
R5
R6
RP1
RP2
RP3
RP4
RP5
RP6
RP7
RP8
CR1
CR2
CR3
JP1
JP2
JP3
XTL1
BT1
0.15 ±.003
.05
DETAIL A
NOTE: BEND 2 -V LEADS TO DIMENSIONS SHOWN
CAUTION

NOTES:

1. FOR LIST OF MATERIAL SEE A0002-14502-00
2. FOR CIRCUIT SCHEMATIC SEE D0003-14502.
3. ALL COMPONENT MOUNTING HOLES IN PRINTED CIRCUIT BOARD WHERE [illegible] SHALL BE MASKED BEFORE WAVE SOLDER
4. [illegible] ER WIRE (ITEM 6) [illegible] XTL1 TO GROUND PAD OF BOARD AS SHOWN.
5. APPLY REF. DES. 7 (RTV) ON ETCH SIDE OF BOARD TO COVER LAND AND TERMINAL AREA OF BT1 (BATTERY).
6. CAPACITOR C19 INSTALL AS SHOWN.
7. INSTALL BATTERY (BT1) AFTER WAVE SOLDER AND ATE TESTING (DO NOT SHORT CIRCUIT BATTERY TERMINALS)

Figure 6-5. DRAM/ROM Board Assembly (A5) Parts Location and Schematic Diagrams (Sheet 1 of 5).

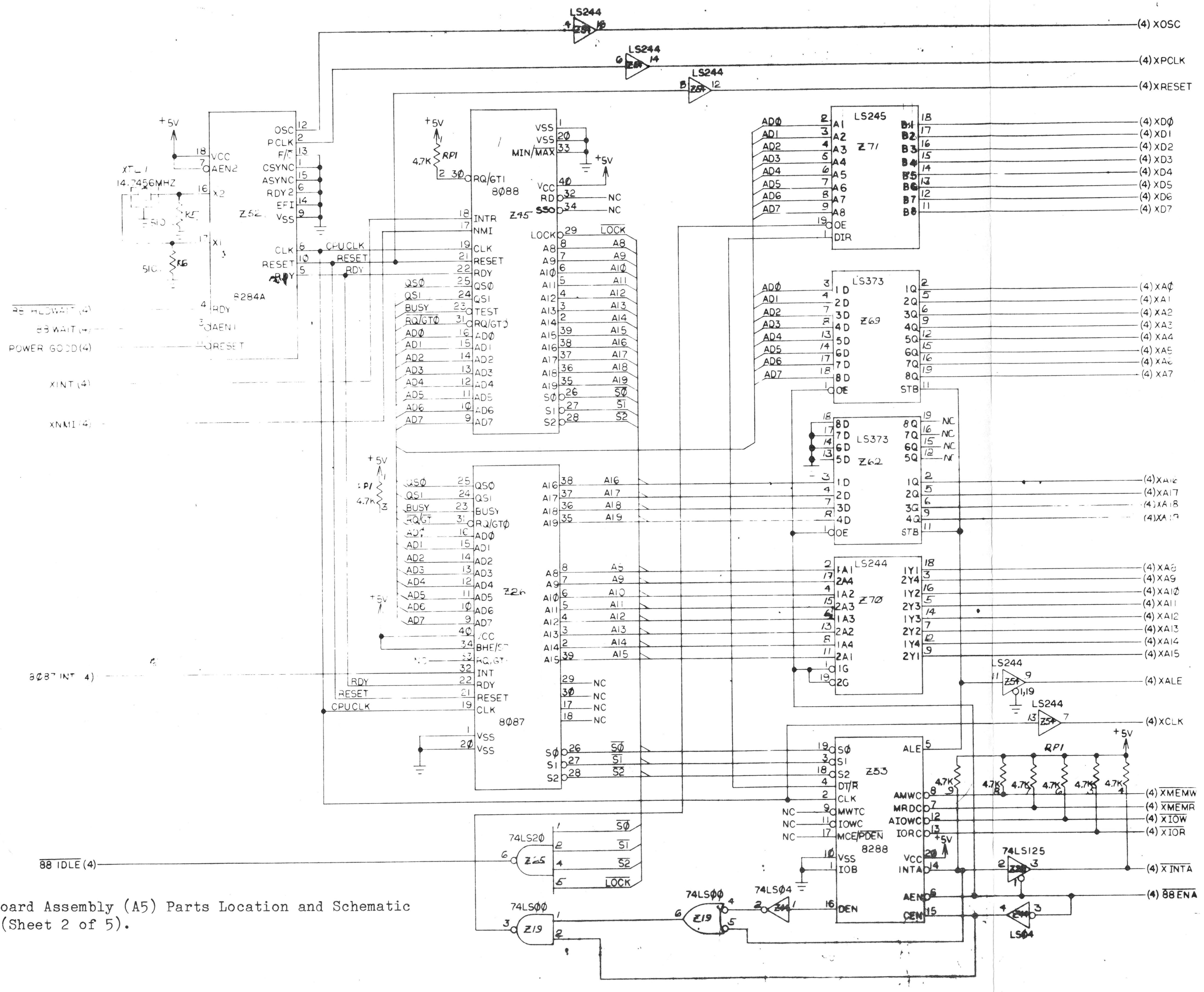

LS244
Z54
(4) XOSC
(4) XPCLK
(4) XRESET
+5V
XTL 1
14.7456MHZ
8284A
Z52
OSC
PCLK
CSYNC
ASYNC
RDY2
EFI
VSS
CLK
RESET
RDY
VCC
AEN2
X1
X2
AEN1
CPUCLK
88 WAIT (4)
POWER GOOD (4)
XINT (4)
XNMI (4)
8087 INT (4)
4.7K
RP1
8088
Z45
RQ/GT1
INTR
NMI
TEST
QS0
QS1
BUSY
RQ/GT0
AD0
AD1
AD2
AD3
AD4
AD5
AD6
AD7
MIN/MAX
RD
SS0
NC
LOCK
A8
A9
A10
A11
A12
A13
A14
A15
A16
A17
A18
A19
S0
S1
S2
8087
Z26
BHE/S7
INT
LS245
Z71
A1
A2
A3
A4
A5
A6
A7
A8
B1
B2
B3
B4
B5
B6
B7
B8
OE
DIR
(4) XD0
(4) XD1
(4) XD2
(4) XD3
(4) XD4
(4) XD5
(4) XD6
(4) XD7
LS373
Z69
STB
(4) XA0
(4) XA1
(4) XA2
(4) XA3
(4) XA4
(4) XA5
(4) XA6
(4) XA7
LS373
Z62
(4) XA16
(4) XA17
(4) XA18
(4) XA19
LS244
Z70
(4) XA8
(4) XA9
(4) XA10
(4) XA11
(4) XA12
(4) XA13
(4) XA14
(4) XA15
(4) XALE
(4) XCLK
8288
Z53
ALE
DT/R
MWTC
IOWC
MCE/PDEN
IOB
DEN
AMWC
MRDC
AIOWC
IORC
INTA
AEN
CEN
RP1
(4) XMEMW
(4) XMEMR
(4) XIOW
(4) XIOR
74LS125
(4) X INTA
(4) 88ENA
LS04
74LS20
Z25
88 IDLE (4)
74LS00
Z19
74LS04

Figure 6-5. DRAM/ROM Board Assembly (A5) Parts Location and Schematic Diagrams (Sheet 2 of 5).

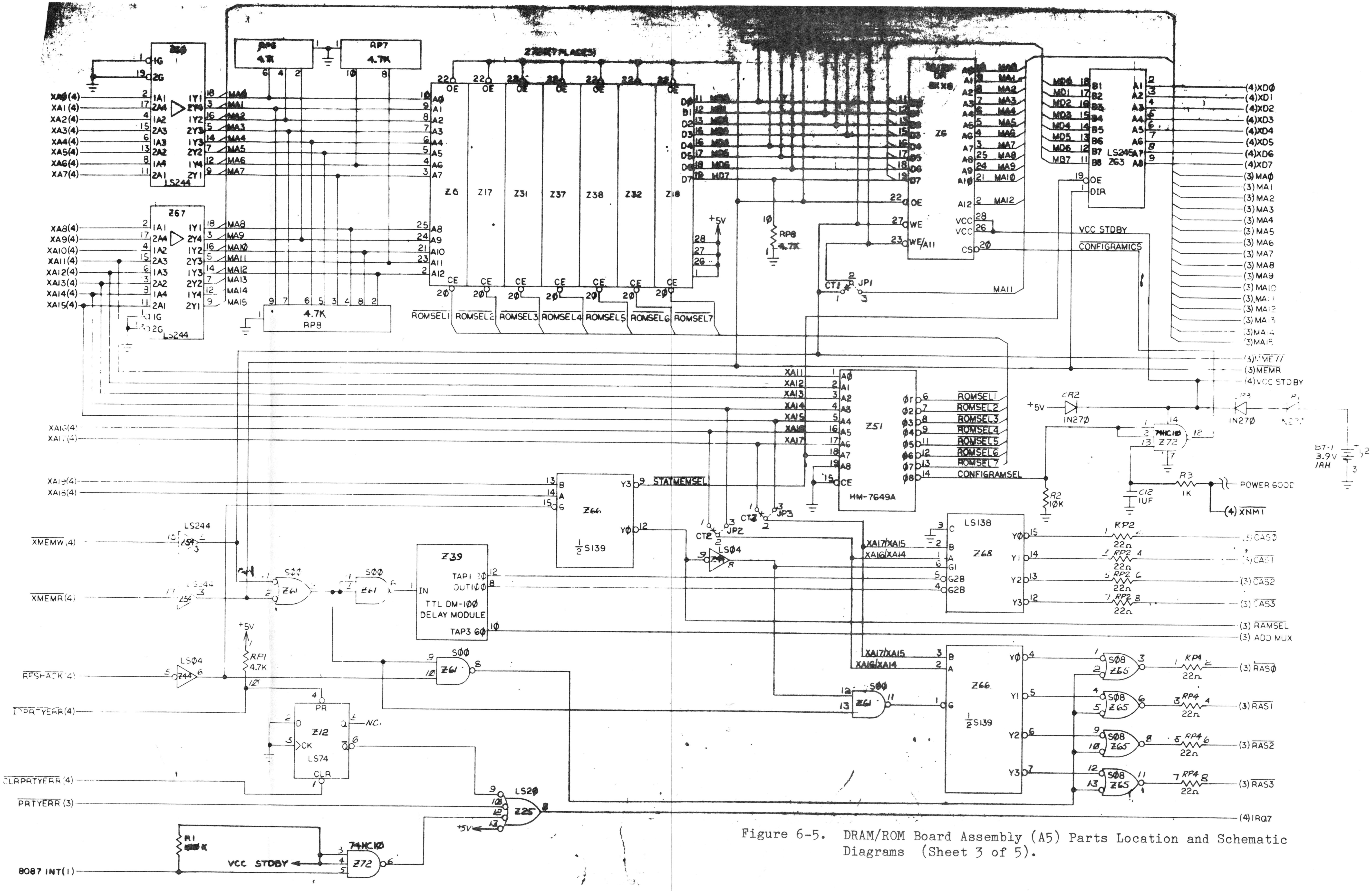

Z60
LS244
Z67
LS244
XA0(4)
XA1(4)
XA2(4)
XA3(4)
XA4(4)
XA5(4)
XA6(4)
XA7(4)
XA8(4)
XA9(4)
XA10(4)
XA11(4)
XA12(4)
XA13(4)
XA14(4)
XA15(4)
MA0
MA1
MA2
MA3
MA4
MA5
MA6
MA7
MA8
MA9
MA10
MA11
MA12
MA13
MA14
MA15
RP6 4.7K
RP7 4.7K
4.7K RP8
Z7-Z18 (7 PLACES)
Z6
Z17
Z31
Z37
Z38
Z32
Z18
OE
CE
ROMSEL1
ROMSEL2
ROMSEL3
ROMSEL4
ROMSEL5
ROMSEL6
ROMSEL7
D0
D1
D2
D3
D4
D5
D6
D7
MD0
MD1
MD2
MD3
MD4
MD5
MD6
MD7
+5V
RP8 4.7K
WE
WE/A11
VCC
CS
JP1
CT
MA11
LS245
Z63
DIR
VCC STDBY
CONFIGRAMICS
(4)XD0
(4)XD1
(4)XD2
(4)XD3
(4)XD4
(4)XD5
(4)XD6
(4)XD7
(3)MA0
(3)MA1
(3)MA2
(3)MA3
(3)MA4
(3)MA5
(3)MA6
(3)MA7
(3)MA8
(3)MA9
(3)MA10
(3)MA11
(3)MA12
(3)MA13
(3)MA14
(3)MA15
(3)MEMW
(3)MEMR
(4)VCC STDBY
Z51
HM-7649A
STATMEMSEL
CONFIGRAMSEL
CR2
IN270
74HC10
Z72
C12 1UF
R2 10K
R3 1K
POWER GOOD
(4)XNMI
BT-1 3.9V 1AH
Z66
1/2 S139
JP2
JP3
LS04
LS138
Z68
XA17/XA15
XA16/XA14
RP2 22Ω
(3)CAS0
(3)CAS1
(3)CAS2
(3)CAS3
(3)RAMSEL
(3)ADD MUX
XMEMW(4)
XMEMR(4)
S00
Z61
Z39
TAP1
OUT100
IN
TTL DM-100 DELAY MODULE
TAP3 60
RESHACK(4)
IOPRTYERR(4)
RP1 4.7K
PR
Z12
LS74
CK
CLR
NC
CLRPRTYERR(4)
PRTYERR(3)
LS20
Z25
(4)IRQ7
S08
Z65
RP4 22Ω
(3)RAS0
(3)RAS1
(3)RAS2
(3)RAS3
R1
VCC STDBY
8087 INT(1)

Figure 6-5. DRAM/ROM Board Assembly (A5) Parts Location and Schematic Diagrams (Sheet 3 of 5).

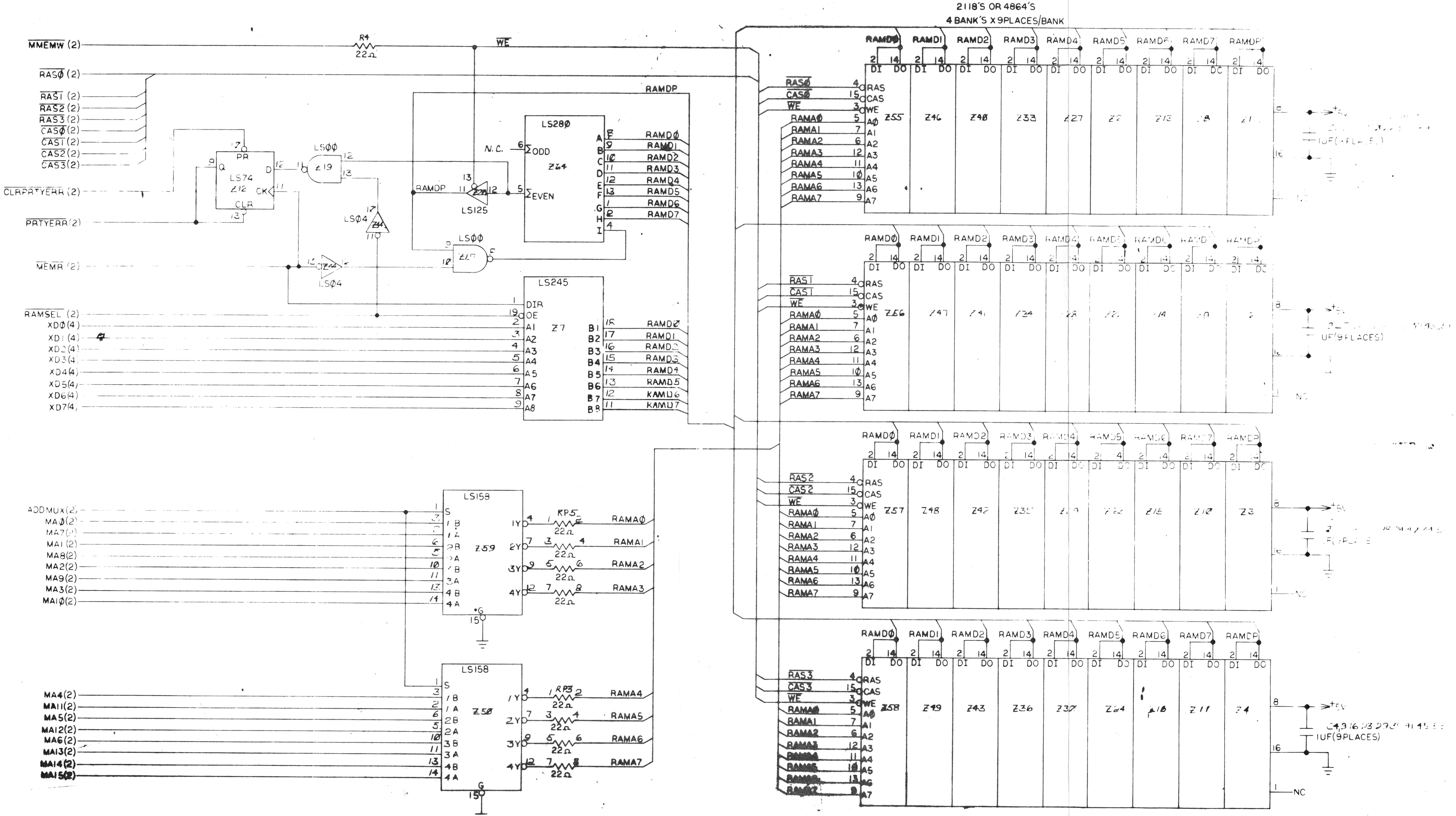
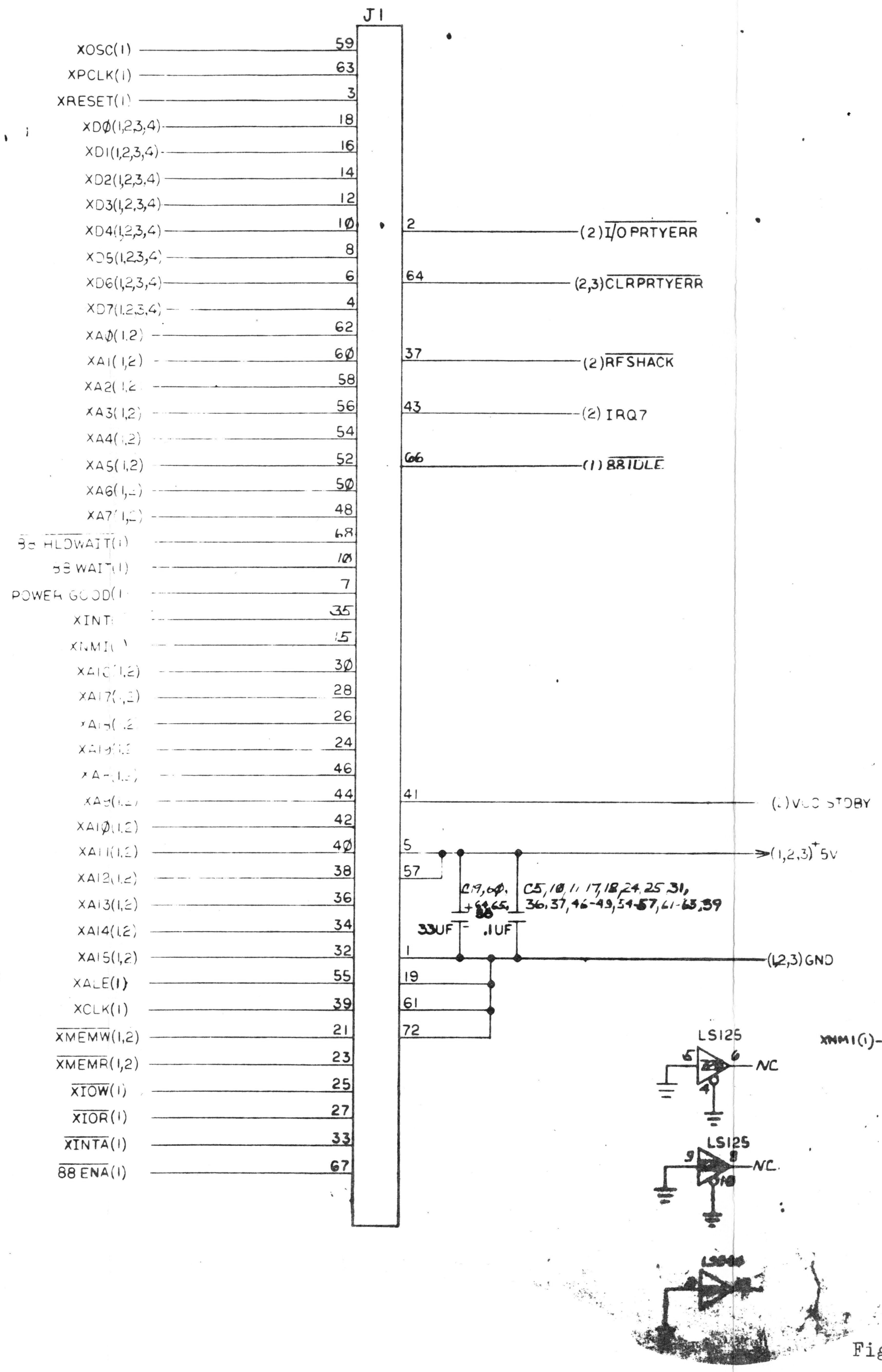
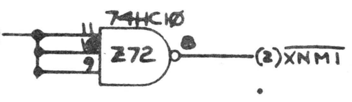

2118'S OR 4864'S
4 BANK'S X 9PLACES/BANK
MMEMW (2)
R4
22Ω
WE
RASØ (2)
RAS1 (2)
RAS2 (2)
RAS3 (2)
CASØ (2)
CAS1 (2)
CAS2 (2)
CAS3 (2)
CLRPRTYERR (2)
PRTYERR (2)
MEMR (2)
RAMSEL (2)
XDØ (4)
XD1 (4)
XD2 (4)
XD3 (4)
XD4 (4)
XD5 (4)
XD6 (4)
XD7 (4)
LS74
Z12
PR
CLR
LSØØ
Z19
LSØ4
Z44
LS125
RAMDP
LS280
Z64
N.C.
ΣODD
ΣEVEN
LS245
Z7
DIR
OE
RAMDØ
RAMD1
RAMD2
RAMD3
RAMD4
RAMD5
RAMD6
RAMD7
ADDMUX (2)
MAØ (2)
MA7 (2)
MA1 (2)
MA8 (2)
MA2 (2)
MA9 (2)
MA3 (2)
MA1Ø (2)
MA4 (2)
MA11 (2)
MA5 (2)
MA12 (2)
MA6 (2)
MA13 (2)
MA14 (2)
MA15 (2)
LS158
Z59
Z5Ø
RP5
RP3
RAMAØ
RAMA1
RAMA2
RAMA3
RAMA4
RAMA5
RAMA6
RAMA7
DI
DO
RAS
CAS
WE
Z55
Z46
Z4Ø
Z33
Z27
Z21
Z56
Z47
Z34
Z57
Z48
Z42
Z1Ø
Z3
Z58
Z49
Z43
Z36
Z37
Z24
Z18
Z11
Z4
+5V
1UF(9PLACES)
C4,9,16,23,29,35,41,45
NC

Figure 6-5. DRAM/ROM Board Assembly (A5) Parts Location and Schematic Diagrams (Sheet 4 of 5).


J1
XOSC(1) 59
XPCLK(1) 63
XRESET(1) 3
XD0(1,2,3,4) 18
XD1(1,2,3,4) 16
XD2(1,2,3,4) 14
XD3(1,2,3,4) 12
XD4(1,2,3,4) 10
XD5(1,2,3,4) 8
XD6(1,2,3,4) 6
XD7(1,2,3,4) 4
XA0(1,2) 62
XA1(1,2) 60
XA2(1,2) 58
XA3(1,2) 56
XA4(1,2) 54
XA5(1,2) 52
XA6(1,2) 50
XA7(1,2) 48
88 HLDWAIT(1) 68
88 WAIT(1) 10
POWER GOOD(1) 7
XINT 35
XNMI 15
XA16(1,2) 30
XA17(1,2) 28
XA18(1,2) 26
XA19(1,2) 24
XA8(1,2) 46
XA9(1,2) 44
XA10(1,2) 42
XA11(1,2) 40
XA12(1,2) 38
XA13(1,2) 36
XA14(1,2) 34
XA15(1,2) 32
XALE(1) 55
XCLK(1) 39
XMEMW(1,2) 21
XMEMR(1,2) 23
XIOW(1) 25
XIOR(1) 27
XINTA(1) 33
88 ENA(1) 67
2 (2) I/O PRTYERR
64 (2,3) CLRPRTYERR
37 (2) RFSHACK
43 (2) IRQ7
66 (1) 88IDLE
41 (1) VCC STDBY
5
57
(1,2,3) +5V
C9,60,+64,65,80
33UF
C5,10,11,17,18,24,25,31,36,37,46-49,54-57,61-63,39
.1UF
1 (1,2,3) GND
19
61
72
LS125
5
6
NC
4
LS125
9
8
NC
10
LS244

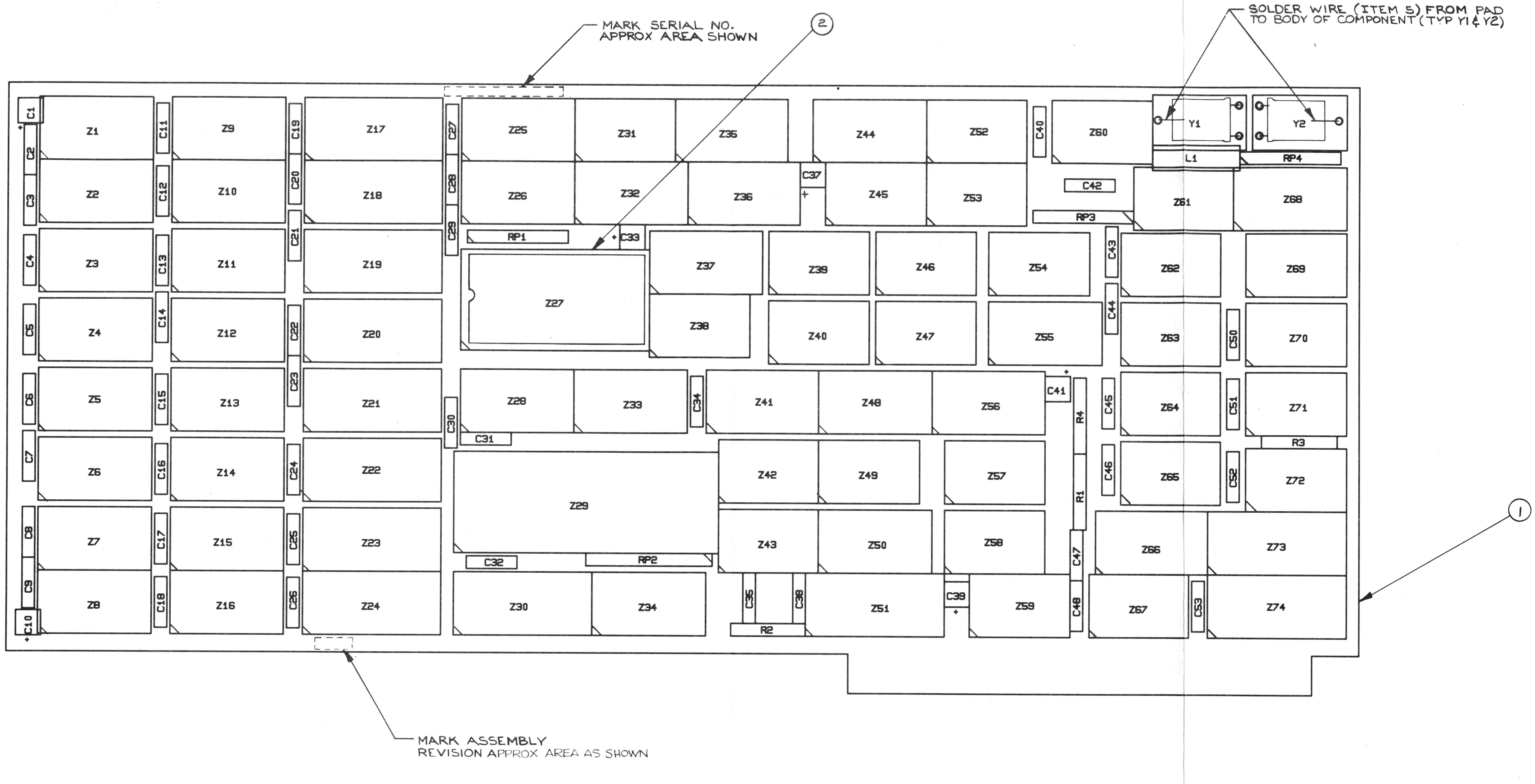

XNMI(1)
74HC10
11
Z72
8
(2) XNMI

POWER AND GROUND LOCATOR CHART			
REF. DES.	DEVICE TYPE	GROUND	+5V
Z71,63,7	74LS245	10	20
Z62,69	74LS373	10	20
Z54,70, 67,60	74LS244	2,10	20
Z53	8288	10	20
Z52	8284	9	18
Z45	8088	1,20	40
Z26	8087	1,20	40
Z19	74LS00	7	14
Z44	74LS04	7	14
Z50,Z59	74LS158	8	16
Z12	74LS74	7	14
Z20	74LS125	4,5,7,9,10	14
Z40-43,27 30,1-4, 8-11,46-49,33-36, 13-16,21-24,55-58	HM4864	16	8
Z68	74LS138	8	16
Z61	74S00	7	14
Z65	74S08	7	14
Z39	TTLDM-100	7	14
Z5,17,18,31, 32,37,38	2764	14	20,28
Z6	6116	14	
Z25	74LS20	7	14
Z51	HM-7649A	10	20
Z66	74S139	8	16
Z72	74HC10	7	
Z64	74LS280	7	14

SPARES		
TYPE	REF. DES.	QTY.
74LS125	Z20	2
74LS244	Z54	1

REF. DESIGNATIONS	
LAST USED	NOT USED
CR3 Z72 R4	

Figure 6-5. DRAM/ROM Board Assembly (A5) Parts Location and Schematic Diagrams (Sheet 5 of 5).



MARK SERIAL NO.
APPROX AREA SHOWN

SOLDER WIRE (ITEM 5) FROM PAD
TO BODY OF COMPONENT (TYP Y1 & Y2)

MARK ASSEMBLY
REVISION APPROX AREA AS SHOWN

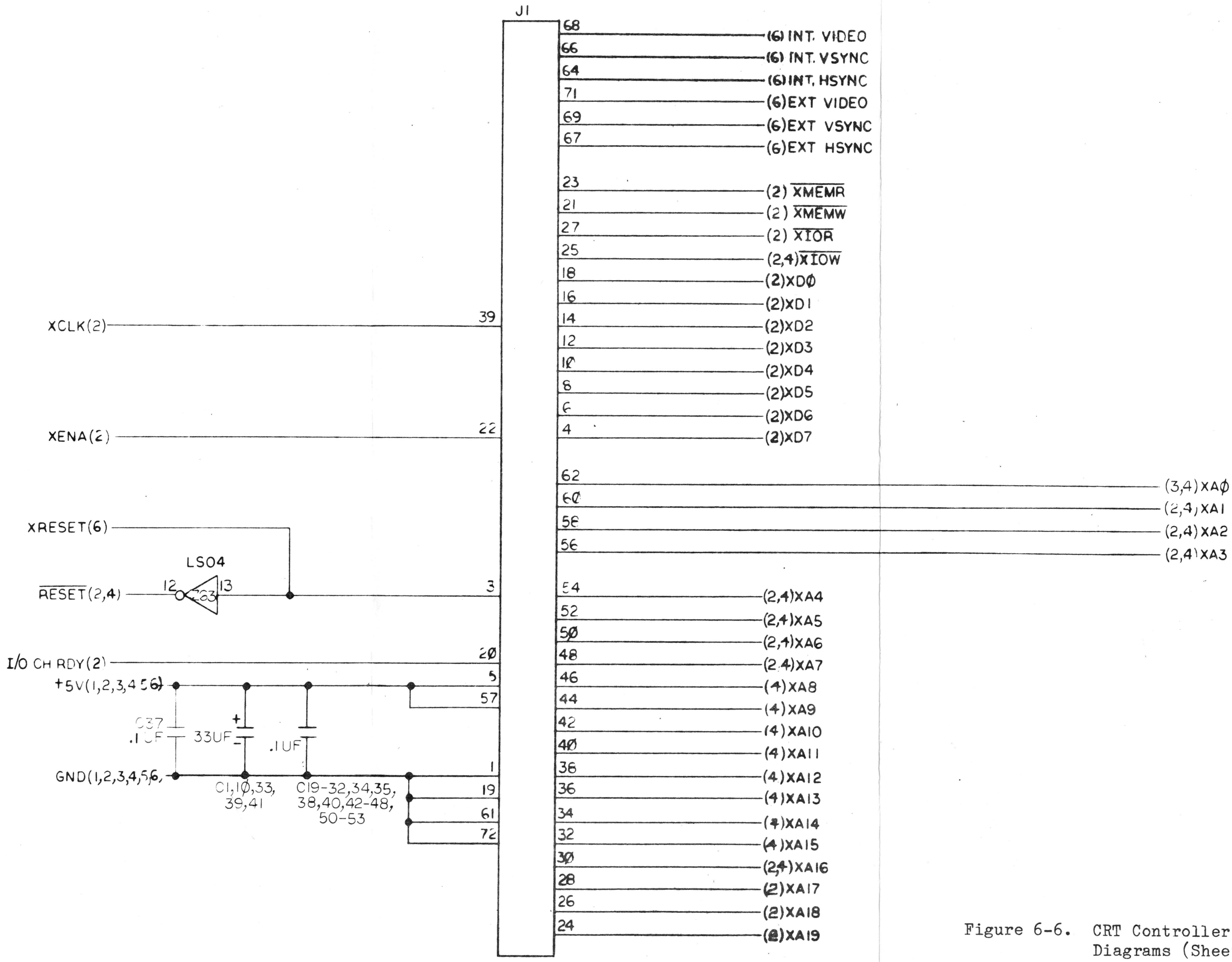
②
①
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
Z1
Z2
Z3
Z4
Z5
Z6
Z7
Z8
C11
C12
C13
C14
C15
C16
C17
C18
Z9
Z10
Z11
Z12
Z13
Z14
Z15
Z16
C19
C20
C21
C22
C23
C24
C25
C26
Z17
Z18
Z19
Z20
Z21
Z22
Z23
Z24
C27
C28
C29
C30
C31
C32
Z25
Z26
RP1
Z27
Z28
Z29
Z30
Z31
Z32
C33
Z33
Z34
Z35
Z36
RP2
C34
C35
C36
C37
C38
Z37
Z38
Z39
Z40
Z41
Z42
Z43
R2
Z44
Z45
Z46
Z47
Z48
Z49
Z50
Z51
Z52
Z53
Z54
Z55
Z56
Z57
Z58
C39
Z59
C40
Z60
C41
C42
RP3
C43
C44
C45
C46
C47
C48
R4
R1
Y1
Y2
L1
RP4
Z61
Z62
Z63
Z64
Z65
Z66
Z67
C50
C51
C52
C53
Z68
Z69
Z70
Z71
R3
Z72
Z73
Z74

NOTES:
1. FOR LIST OF MATERIALS SEE A0002-145[illegible]
2. FOR CIRCUIT SCHEMATIC SEE D0003-145[illegible]

JUMPER CHART	
FROM	TO
Z32-15	Z35-9
Z58-12	Z59-8

ETCH CUT CHART	
SIDE	LOCATION
COMPONENT	Z35-9
CIRCUIT	Z58-12

Figure 6-6. CRT Controller Board Assembly (A6) Parts Location and Schematic Diagrams (Sheet 1 of 7).


J1
68
66
64
71
69
67
(6) INT. VIDEO
(6) INT. VSYNC
(6) INT. HSYNC
(6)EXT VIDEO
(6)EXT VSYNC
(6)EXT HSYNC
23
21
27
25
18
16
14
12
10
8
6
4
(2) XMEMR
(2) XMEMW
(2) XIOR
(2,4)XIOW
(2)XD0
(2)XD1
(2)XD2
(2)XD3
(2)XD4
(2)XD5
(2)XD6
(2)XD7
XCLK(2)
39
XENA(2)
22
62
60
58
56
(3,4)XA0
(2,4)XA1
(2,4)XA2
(2,4)XA3
XRESET(6)
LS04
RESET(2,4)
12
Z63
13
3
54
52
50
48
46
44
42
40
38
36
34
32
30
28
26
24
(2,4)XA4
(2,4)XA5
(2,4)XA6
(2,4)XA7
(4)XA8
(4)XA9
(4)XA10
(4)XA11
(4)XA12
(4)XA13
(4)XA14
(4)XA15
(2,4)XA16
(2)XA17
(2)XA18
(2)XA19
I/O CH RDY(2)
20
+5V(1,2,3,4 5 6)
5
57
C37
.1UF
+
33UF
-
.1UF
GND(1,2,3,4,5,6,
C1,10,33,
39,41
C19-32,34,35,
38,40,42-48,
50-53
1
19
61
72

CONNECTOR TYPE	
REF. DES.	MFG.
J1	72 PIN EDGE FINGER . FIT: AMP. 5 30843-8

POWER AND GROUND LOCATOR CHART			
REF. DES.	DEVICE TYPE	GND	+5V
Z21-24,30	74LS374	10	20
Z17-20	74S374	10	20
Z43,62,65	74LS00	7	14
Z42,63	74LS04	7	14
Z61	74LS393	7	14
Z25,33,37,44	74LS138	8	16
Z26,28,32	74LS166	8	16
Z31,57	74S02	7	14
Z34,35,36	74S174	8	16
Z27	2764	14	28
Z1-16	2118-4	16	8
Z73	74LS273	10	20
Z38,46,60	74S00	7	14
Z45	74S10	7	14
Z40,47,53	74S86	7	14
Z52	74S74	7	14
Z51	74LS244	10	20
Z54	74S04	7	14
Z66	74LS139	8	16
Z50	74LS175	8	16
Z49,64,69,70,72	74LS74	7	14
Z67	74LS08	7	14
Z39,	74LS32	7	14
Z74	74LS245	10	20
Z55	74S112A	8	16
Z41	74LS157	8	16
Z56	74S175	8	16
Z48	74S157	8	16
Z29	68B45S	1	20
Z68	74S124	8,9	15,16
Z71	7407	7	14
Z58,59	74S32	7	14

Figure 6-6. CRT Controller Board Assembly (A6) Parts Location and Schematic Diagrams (Sheet 2 of 7).

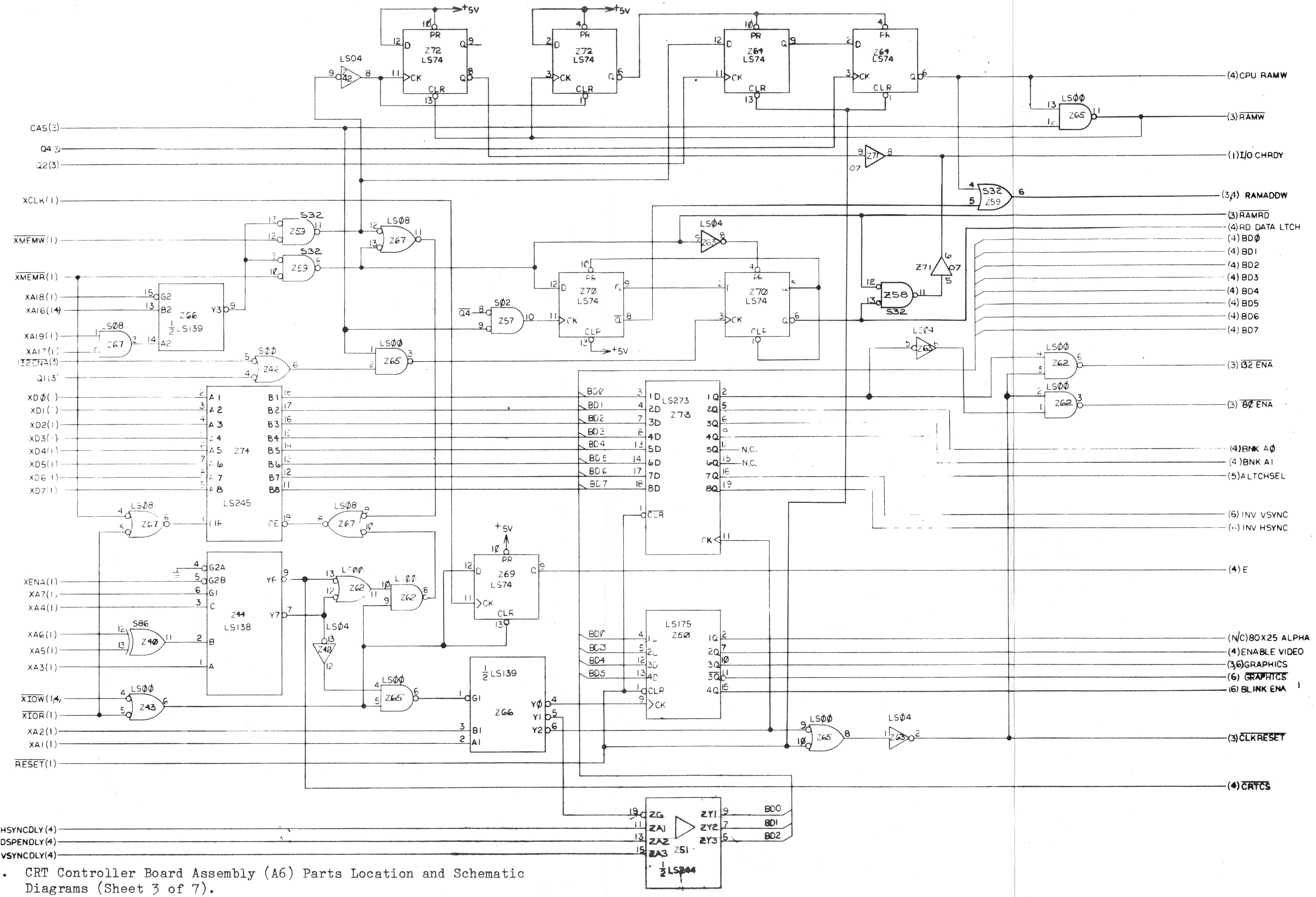

CAS(3)
Q4(3)
Q2(3)
XCLK(1)
XMEMW(1)
XMEMR(1)
XA18(1)
XA16(14)
XA19(1)
XA17(1)
132ENA(3)
Q1(3)
XD0(1)
XD1(1)
XD2(1)
XD3(1)
XD4(1)
XD5(1)
XD6(1)
XD7(1)
XENA(1)
XA7(1)
XA4(1)
XA6(1)
XA5(1)
XA3(1)
XIOW(14)
XIOR(1)
XA2(1)
XA1(1)
RESET(1)
HSYNCDLY(4)
DSPENDLY(4)
VSYNCDLY(4)
Z72 LS74
Z64 LS74
Z70 LS74
Z69 LS74
LS04 Z42
LS00 Z65
S32 Z59
LS08 Z67
S02 Z57
Z66 1/2 LS139
LS08 Z67
LS00 Z42
Z74 LS245
Z44 LS138
S86 Z40
LS00 Z43
LS00 Z62
LS04 Z42
LS04 Z63
Z71
S32 Z58
LS273 Z73
LS175 Z50
Z51 1/2 LS244
BD0 BD1 BD2 BD3 BD4 BD5 BD6 BD7
N.C.
+5V
(4) CPU RAMW
(3) RAMW
(1) I/O CHRDY
(3,4) RAMADDW
(3) RAMRD
(4) RD DATA LTCH
(4) BD0
(4) BD1
(4) BD2
(4) BD3
(4) BD4
(4) BD5
(4) BD6
(4) BD7
(3) 132 ENA
(3) 80 ENA
(4) BNK A0
(4) BNK A1
(5) ALTCHSEL
(6) INV VSYNC
(6) INV HSYNC
(4) E
(N/C) 80X25 ALPHA
(4) ENABLE VIDEO
(3,6) GRAPHICS
(6) GRAPHICS
(6) BLINK ENA
(3) CLKRESET
(4) CRTCS

Figure 6-6. CRT Controller Board Assembly (A6) Parts Location and Schematic Diagrams (Sheet 3 of 7).

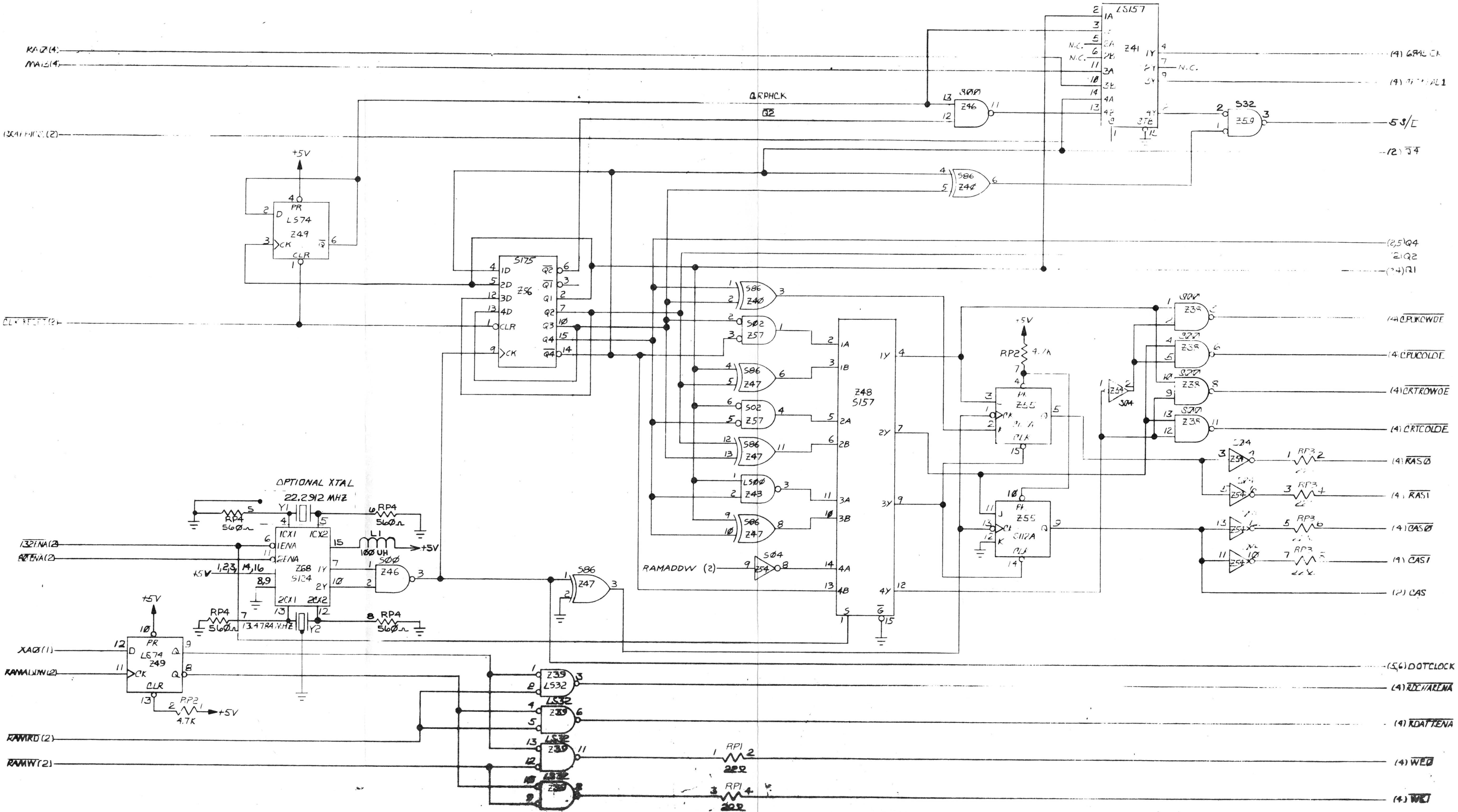

LS157
Z41
S00
Z46
GRPHCK
Q2
S32
Z59
S86
Z40
LS74
Z49
S175
Z56
S02
Z57
Z47
LS00
Z43
Z48
S157
S04
Z54
RAMADDW (2)
+5V
RP2 4.7K
Z55
S112A
Z39
Z38
LS32
OPTIONAL XTAL
22.2912 MHZ
Y1
Y2
RP4 560Ω
L1 100 UH
Z68
S124
13.47 MHZ
RP1 22Ω
RP3 22Ω
XA0 (1)
RAMADDW (2)
RAMRD (2)
RAMW (2)
132ENA (2)
80ENA (2)
CLKRESET (2)
GRAPHICS (2)
MA12 (4)
(4) CPUROWOE
(4) CPUCOLOE
(4) CRTROWOE
(4) CRTCOLOE
(4) RAS0
(4) RAS1
(4) CAS0
(4) CAS1
(2) CAS
(5,6) DOTCLOCK
(4) RDCHARENA
(4) RDATTENA
(4) WE0
(4) WE1
(8,5) Q4
(2) Q2
(4) Q1
(2) Q4
S/C
N.C.

Figure 6-6. CRT Controller Board Assembly (A6) Parts Location and Schematic Diagrams (Sheet 4 of 7).

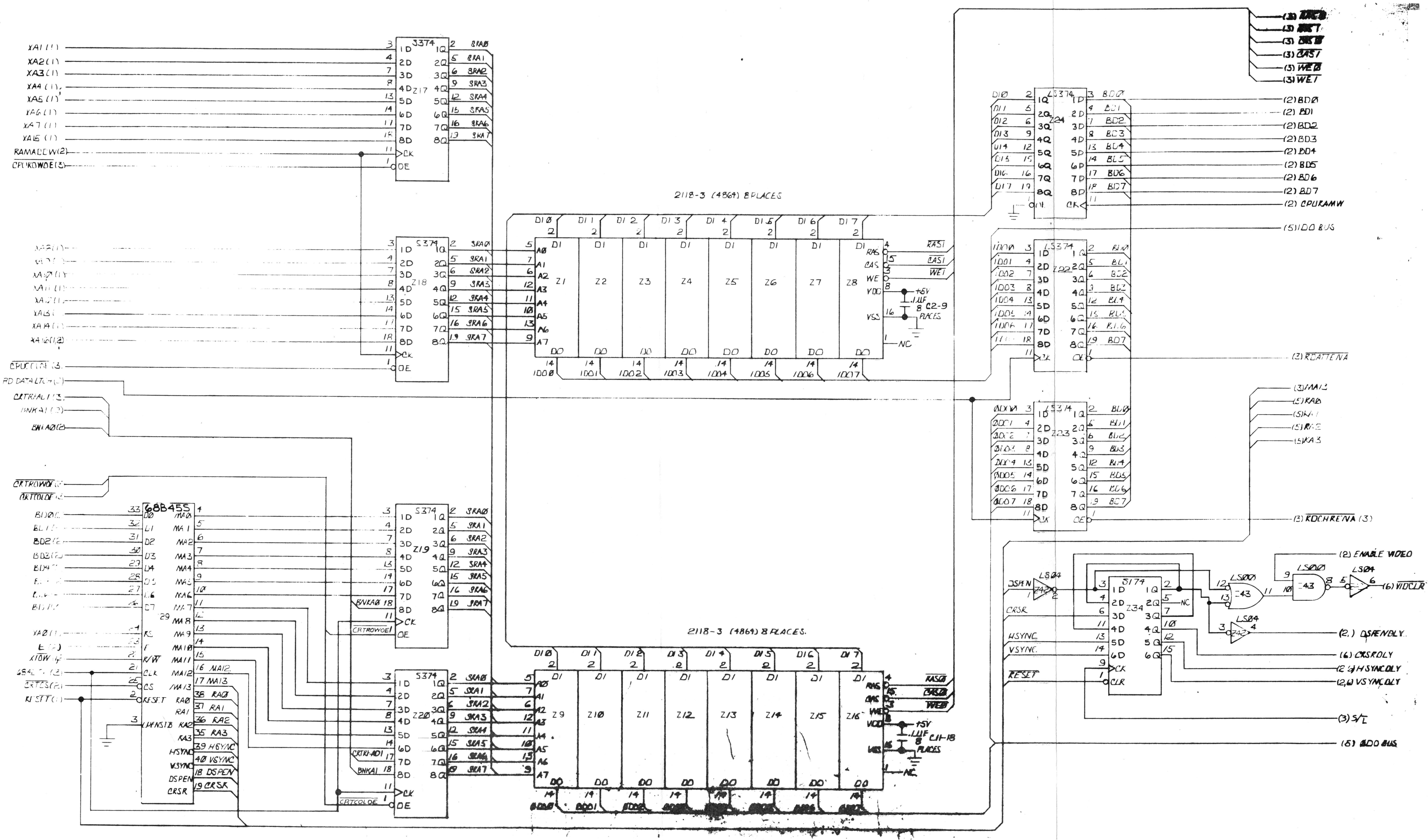

S374
Z17
Z18
Z19
Z20
68B45S
2118-3 (4864) 8 PLACES
Z1
Z2
Z3
Z4
Z5
Z6
Z7
Z8
2118-3 (4864) 8 PLACES.
Z9
Z10
Z11
Z12
Z13
Z14
Z15
Z16
LS374
Z24
Z22
Z23
S174
Z34
LS04
LS00
Z43
Z42
XA1 (1)
XA2 (1)
XA3 (1)
XA4 (1)
XA5 (1)
XA6 (1)
XA7 (1)
XA15 (1)
RAMADDW (2)
CPUKOWOE (3)
CPUCOLOE (3)
RD DATA LTCH (2)
CRTRWAL1 (3)
BNKA1 (2)
BNKA0 (2)
CRTROWOE (3)
CRTCOLOE (3)
RAS1
CAS1
WE1
RAS0
CAS0
WE0
+5V
.1UF
8 C2-9 PLACES
8 C11-18 PLACES
NC
(3) RAS0
(3) RAS1
(3) CAS0
(3) CAS1
(3) WE0
(3) WE1
(2) BD0
(2) BD1
(2) BD2
(2) BD3
(2) BD4
(2) BD5
(2) BD6
(2) BD7
(2) CPURAMW
(5) ID0 BUS
(3) RDATTENA
(3) MA13
(5) KA0
(5) KA1
(5) KA2
(5) KA3
(3) RDCHRENA (3)
(2) ENABLE VIDEO
(6) VIDCLR
(2) DSPENDLY
(6) CRSRDLY
(2,6) HSYNCDLY
(2,6) VSYNCDLY
(3) S/T
(5) 0D0 BUS
DSPEN
CRSR
HSYNC
VSYNC
RESET

Figure 6-6. CRT Controller Board Assembly (A6) Parts Location and Schematic Diagrams (Sheet 5 of 7).

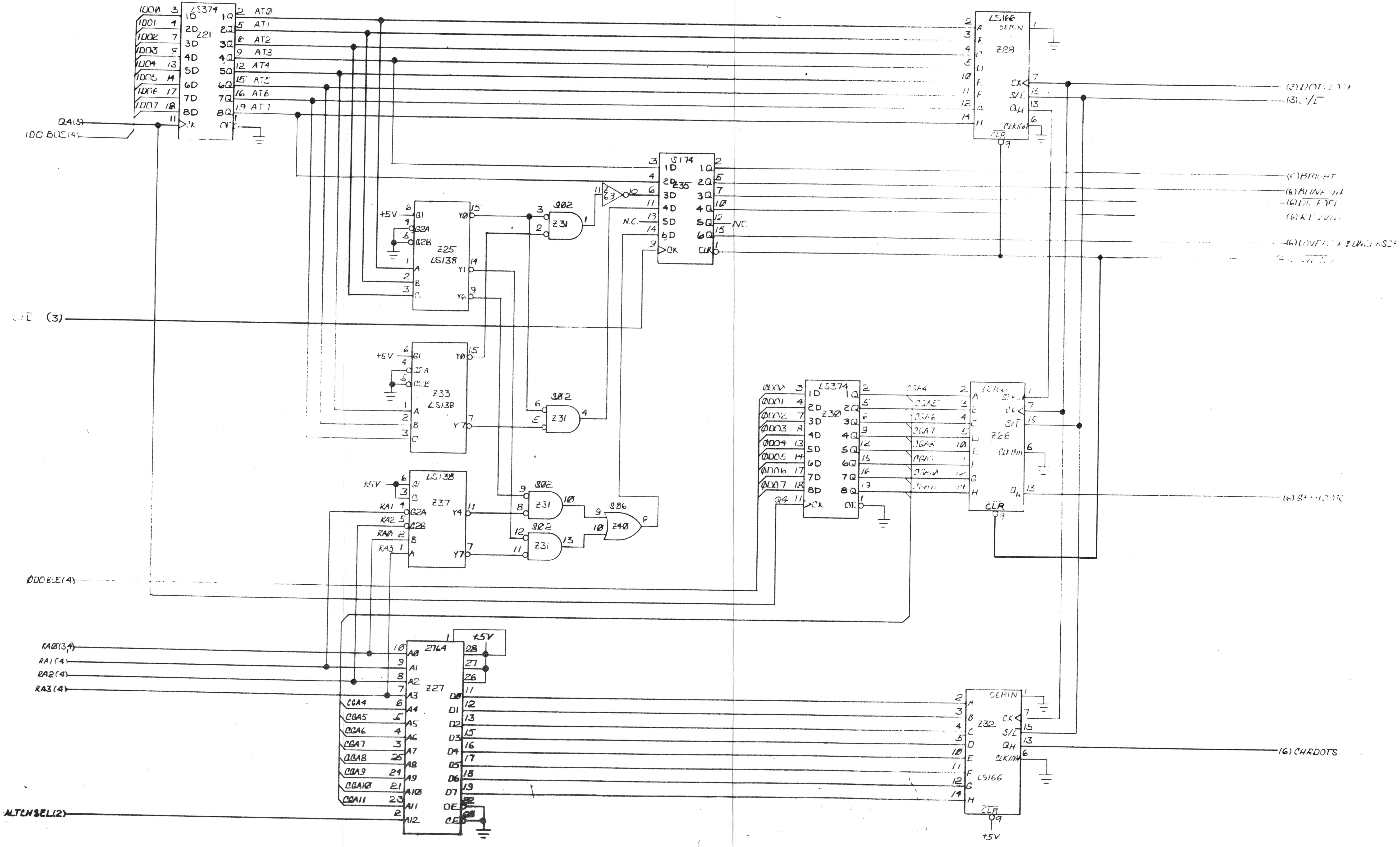

LS374
Z21
IDD0
IDD1
IDD2
IDD3
IDD4
IDD5
IDD6
IDD7
Q4(3)
IDD BUS(4)
AT0
AT1
AT2
AT3
AT4
AT5
AT6
AT7
LS166
Z28
SERIN
CK
S/L
QH
CLKINH
CLR
(3) DOTCLK
(3) S/L
LS174
Z35
N.C.
(6) BRIGHT
(6) BLINK
(6) REVERSE
(6) UNDERLINE
LS138
Z25
Z33
Z37
+5V
G1
G2A
G2B
Y0
Y1
Y4
Y6
Y7
S/L (3)
Z31
Z63
Z40
KA1
KA2
KA0
KA3
LS374
Z30
DD00
DD01
DD02
DD03
DD04
DD05
DD06
DD07
Q4
CGA4
CGA5
CGA6
CGA7
CGA8
CGA9
CGA10
CGA11
Z26
(6) GRAPHICS
DDOBUS(4)
RA0(3,4)
RA1(4)
RA2(4)
RA3(4)
ALTCHSEL(2)
2764
Z27
OE
CE
Z32
LS166
(6) CHRDOTS

Figure 6-6. CRT Controller Board Assembly (A6) Parts Location and Schematic Diagrams (Sheet 6 of 7).

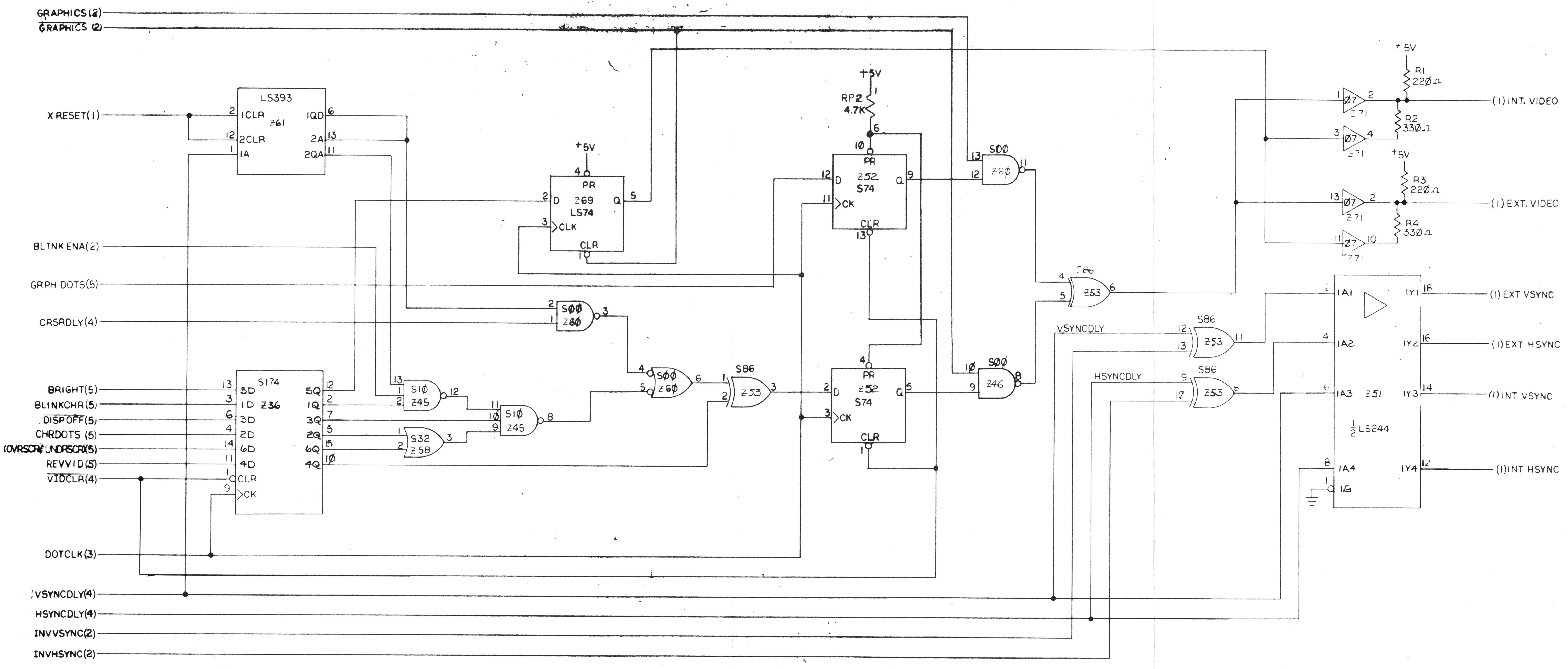

GRAPHICS(2)
GRAPHICS (2)
X RESET(1)
BLINK ENA(2)
GRPH DOTS(5)
CRSRDLY(4)
BRIGHT(5)
BLINKCHR(5)
DISPOFF(5)
CHRDOTS (5)
(OVRSCR) UNDRSCR(5)
REVVID(5)
VIDCLR(4)
DOTCLK(3)
VSYNCDLY(4)
HSYNCDLY(4)
INVVSYNC(2)
INVHSYNC(2)
LS393
Z61
1CLR
2CLR
1A
1QD
2A
2QA
+5V
PR
Z69
LS74
D
Q
CLK
CLR
S174
Z36
5D
1D
3D
2D
6D
4D
CLR
CK
5Q
1Q
3Q
2Q
6Q
4Q
S00
Z60
S10
Z45
S32
Z58
S86
Z53
RP2
4.7K
Z52
S74
CK
S00
Z46
Ø7
Z71
R1
220Ω
R2
330Ω
R3
220Ω
R4
330Ω
(1) INT. VIDEO
(1) EXT. VIDEO
VSYNCDLY
HSYNCDLY
1A1
1A2
1A3
1A4
1G
1Y1
1Y2
1Y3
1Y4
Z51
1/2 LS244
(1) EXT VSYNC
(1) EXT HSYNC
(1) INT VSYNC
(1) INT HSYNC

Figure 6-6. CRT Controller Board Assembly (A6) Parts Location and Schematic Diagrams (Sheet 7 of 7).

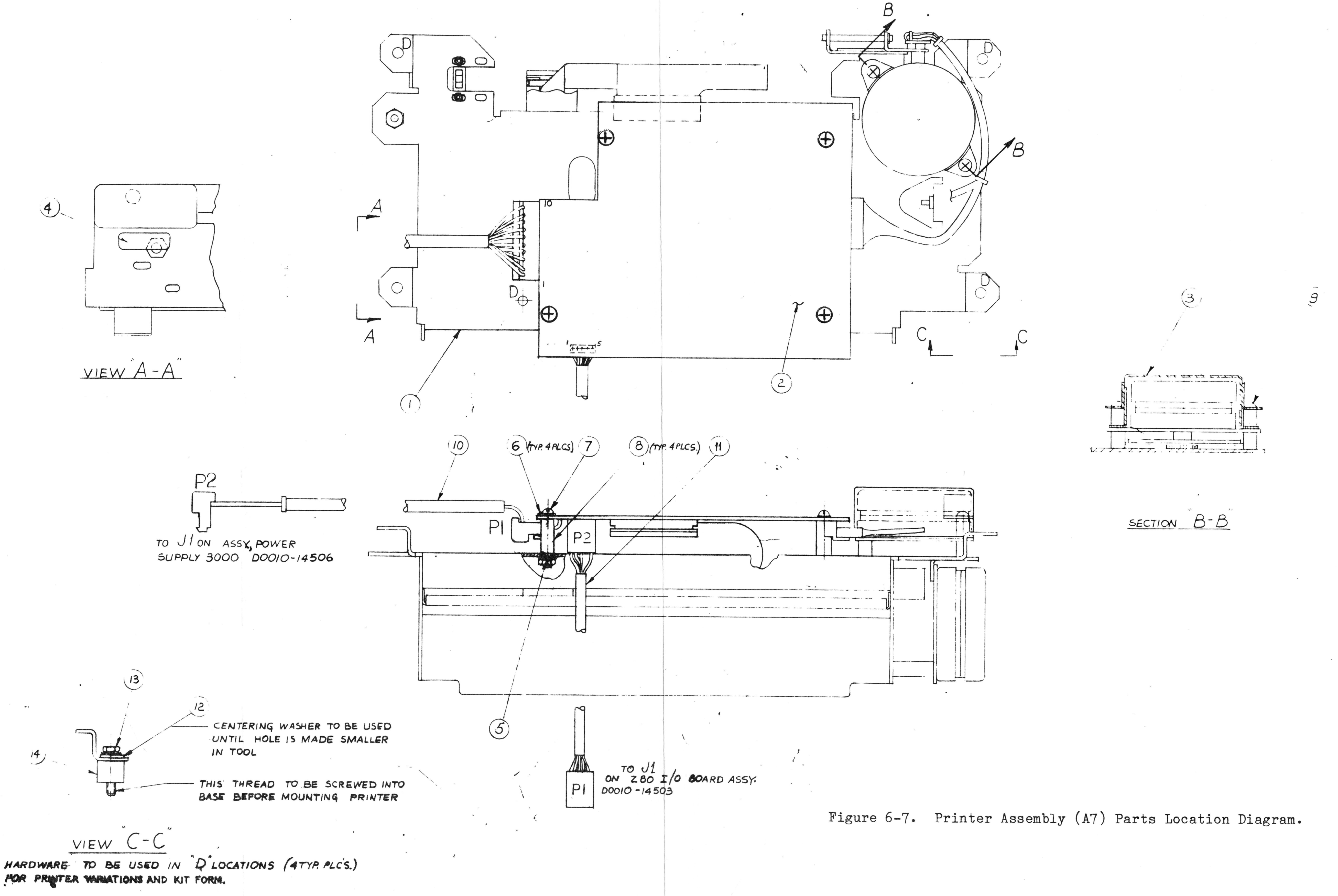
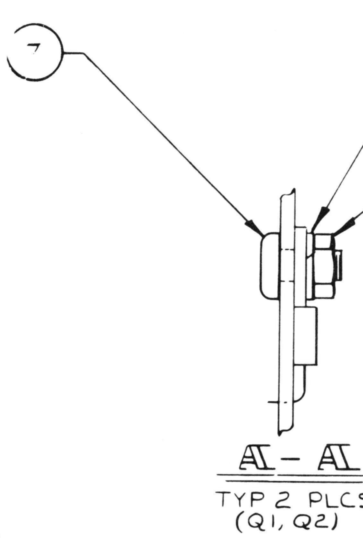
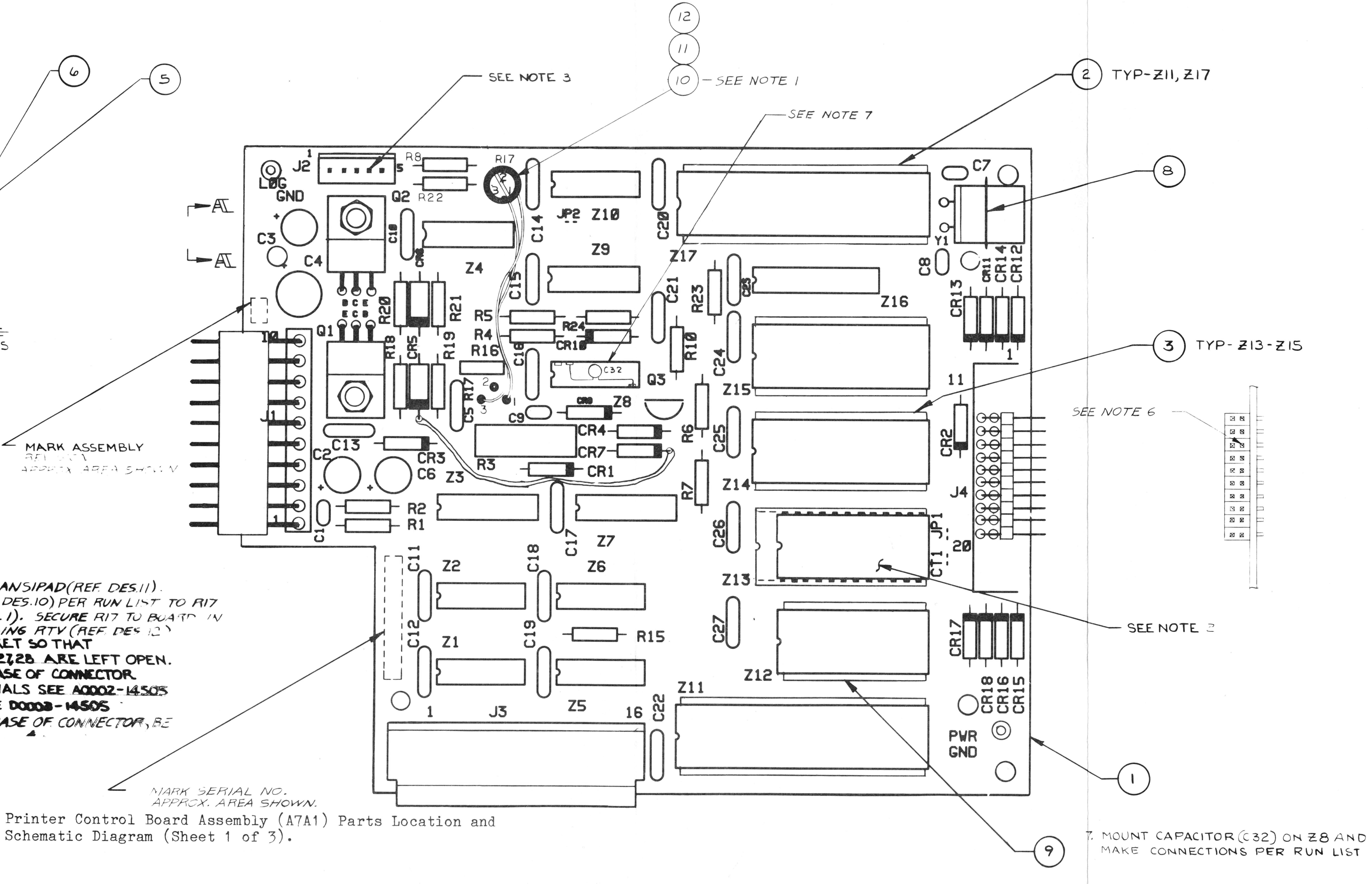

B
B
D
D
D
D
A
A
10
1
5
C
C
④
VIEW "A-A"
①
②
③
9
SECTION "B-B"
⑩
⑥ (TYP. 4 PLCS.)
⑦
⑧ (TYP. 4 PLCS.)
⑪
P2
TO J1 ON ASSY, POWER SUPPLY 3000 D0010-14506
P1
P2
⑤
P1
TO J1 ON Z80 I/O BOARD ASSY. D0010-14503
⑬
⑫
⑭
CENTERING WASHER TO BE USED UNTIL HOLE IS MADE SMALLER IN TOOL
THIS THREAD TO BE SCREWED INTO BASE BEFORE MOUNTING PRINTER
VIEW "C-C"
HARDWARE TO BE USED IN "D" LOCATIONS (4 TYP. PLC'S.) FOR PRINTER VARIATIONS AND KIT FORM.

Figure 6-7. Printer Assembly (A7) Parts Location Diagram.

RUN LIST (NOTE 1)		
ITEM	FROM	TO
1	C32	Z8-13
2	R17-2	PAD-1
3	R17-3	PAD-3
4	C32	Z8-7


7
6
5
A – A
TYP 2 PLCS
(Q1, Q2)


12
11
10
2
TYP-Z11, Z17
8
3
TYP-Z13-Z15
1
9
J2
LOG GND
Q2
R8
R22
R17
C3
C4
Q1
J1
C2
C13
C1
R2
R1
R18
R20
CR5
R21
R19
C16
Z4
C5
R17
R3
CR3
C6
Z3
C14
C15
C19
R5
R4
R16
R24
CR10
C32
C9
Z8
CR4
CR7
CR1
JP2
Z10
Z9
C20
Z17
C21
R23
R10
Q3
R6
R7
C17
Z7
C11
Z2
C18
Z6
C12
Z1
C19
R15
Z5
J3
1
16
C22
Z11
Z12
C27
C26
Z13
C25
Z14
C24
Z15
C23
Z16
C8
C7
Y1
CR11
CR14
CR12
CR13
11
1
CR2
J4
JP1
20
CT1
CR17
CR18
CR16
CR15
PWR GND

SEE NOTE 3

SEE NOTE 1

SEE NOTE 7

SEE NOTE 6

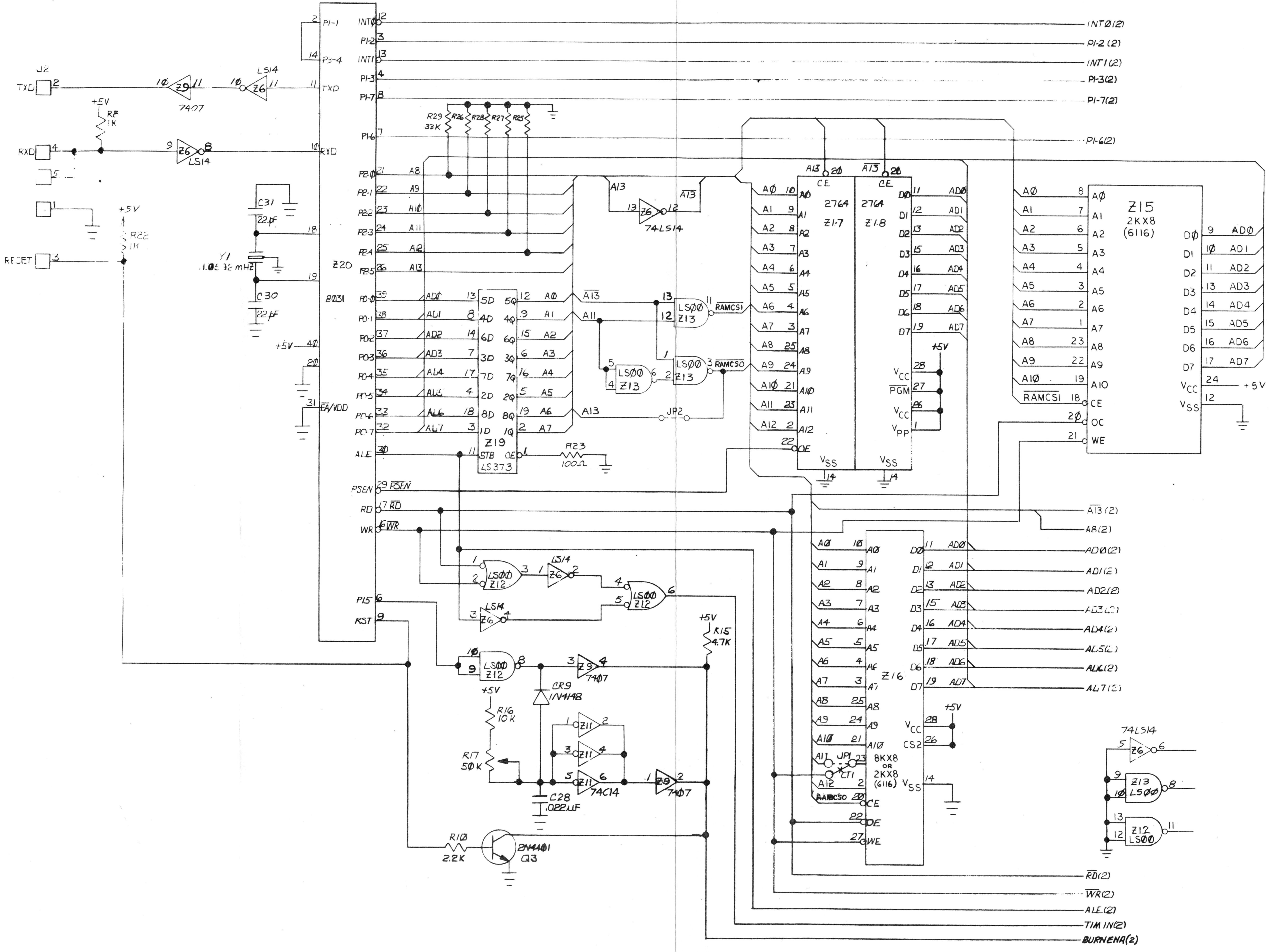
SEE NOTE 2

MARK ASSEMBLY REF ... APPROX. AREA SHOWN

MARK SERIAL NO. APPROX. AREA SHOWN.

1. MOUNT R17 TO TRANSIPAD (REF. DES. 11). SOLDER WIRE (REF. DES. 10) PER RUN LIST TO R17 AND BOARD (REF. DES. 1). SECURE R17 TO BOARD IN LOCATION SHOWN USING RTV (REF. DES. 12)
2. PLACE Z13 IN SOCKET SO THAT SOCKET PINS 1, 2, 27, 28 ARE LEFT OPEN.
3. CUT J2 PIN 4, TO BASE OF CONNECTOR
4. FOR LIST OF MATERIALS SEE A0002-14505
5. FOR SCHEMATIC SEE D0003-14505
6. CUT J4 PIN 3, TO BASE OF CONNECTOR, BE INSTALLATION.
7. MOUNT CAPACITOR (C32) ON Z8 AND MAKE CONNECTIONS PER RUN LIST

Figure 6-8. Printer Control Board Assembly (A7A1) Parts Location and Schematic Diagram (Sheet 1 of 3).


J2
TXD
RXD
RESET
+5V
R8 1K
R22 1K
10 Z9 11 7407
10 Z6 11 LS14
9 Z6 8 LS14
C31 22pF
Y1 11.0592 mHz
C30 22pF
Z20
8031
P1-1
P3-4
INT0
P1-2
INT1
P1-3
P1-7
P1-6
TXD
RXD
P2-0
P2-1
P2-2
P2-3
P2-4
P2-5
P0-0
P0-1
P0-2
P0-3
P0-4
P0-5
P0-6
P0-7
EA/VDD
ALE
PSEN
RD
WR
P15
RST
R29 33K
R26
R28
R27
R25
Z19
LS373
STB
OE
R23 100Ω
A13
74LS14
LS00 Z13
RAMCS1
RAMCS0
JP2
2764 Z1-7
2764 Z1-8
CE
OE
PGM
VCC
VPP
VSS
Z15
2KX8 (6116)
WE
OC
+5V
LS00 Z12
LS14 Z6
Z9 7407
CR9 1N4148
R16 10K
R17 50K
Z11
74C14
Z8 7407
C28 .022µF
R15 4.7K
R10 2.2K
2N4401 Q3
Z16
8KX8 OR 2KX8 (6116)
CS2
JP1
CT1
INT0(2)
P1-2(2)
INT1(2)
P1-3(2)
P1-7(2)
P1-6(2)
A13(2)
A8(2)
AD0(2)
AD1(2)
AD2(2)
AD3(2)
AD4(2)
AD5(2)
AD6(2)
AD7(2)
RD(2)
WR(2)
ALE(2)
TIM IN(2)
BURNENA(2)

NOTE:

1. UNLESS OTHERWISE [illegible] ALL [illegible] 1/4 [illegible]
2. FOR 8KX8 RAM:
   a. DO NOT INSTALL Z15
   b. CUT CT1
   c. INSTALL JP1, JP2
3. THE VOLTAGE AT THIS POINT VARIES WITH THE PRINT HEAD INSTALLED

HEAD TYPE	VOLTAGE
A	2.[illegible]
B	2.3
C	11.7

Figure 6-8. Printer Control Board Assembly (A7A1) Parts Location and Schematic Diagram (Sheet 2 of 3).

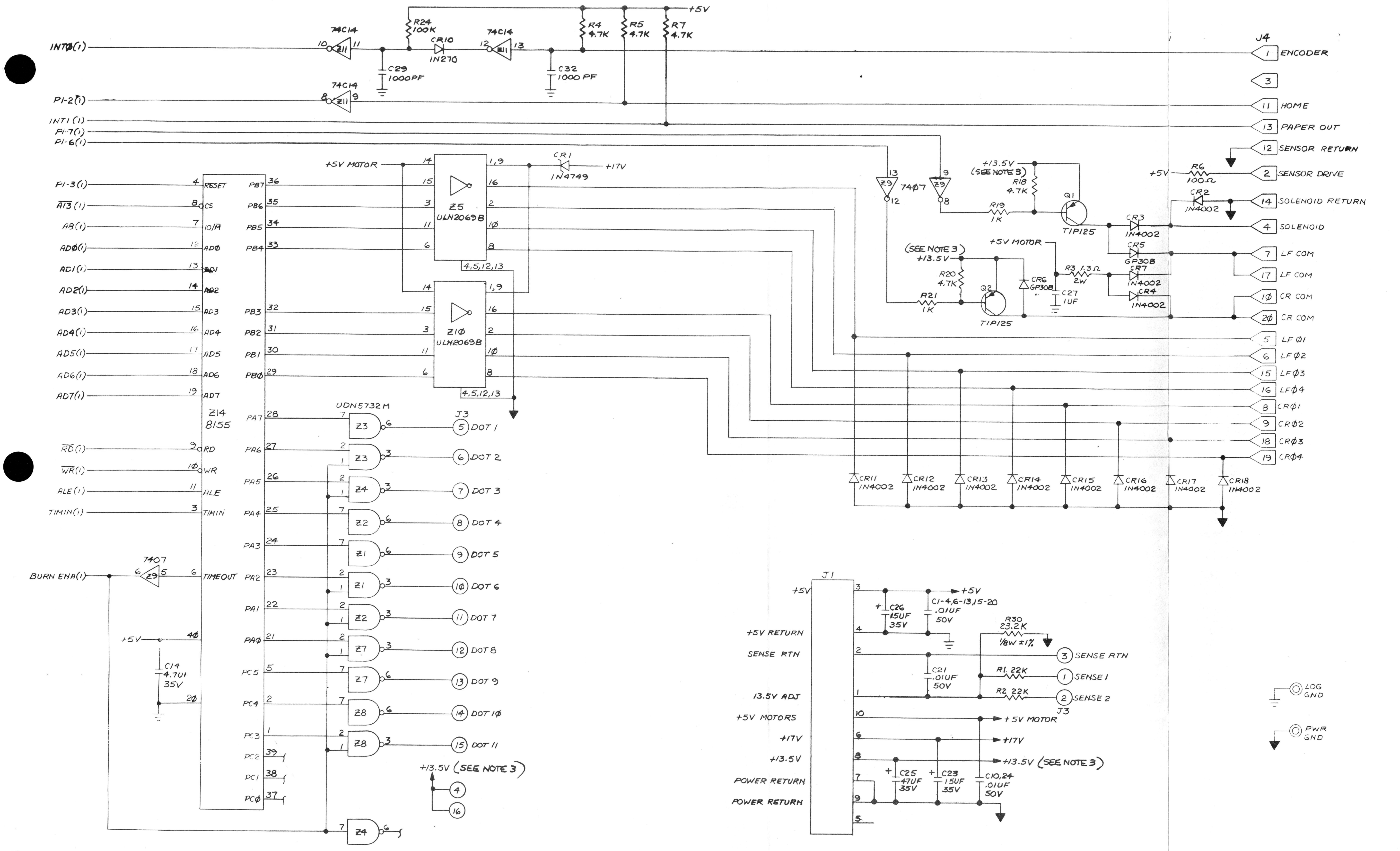
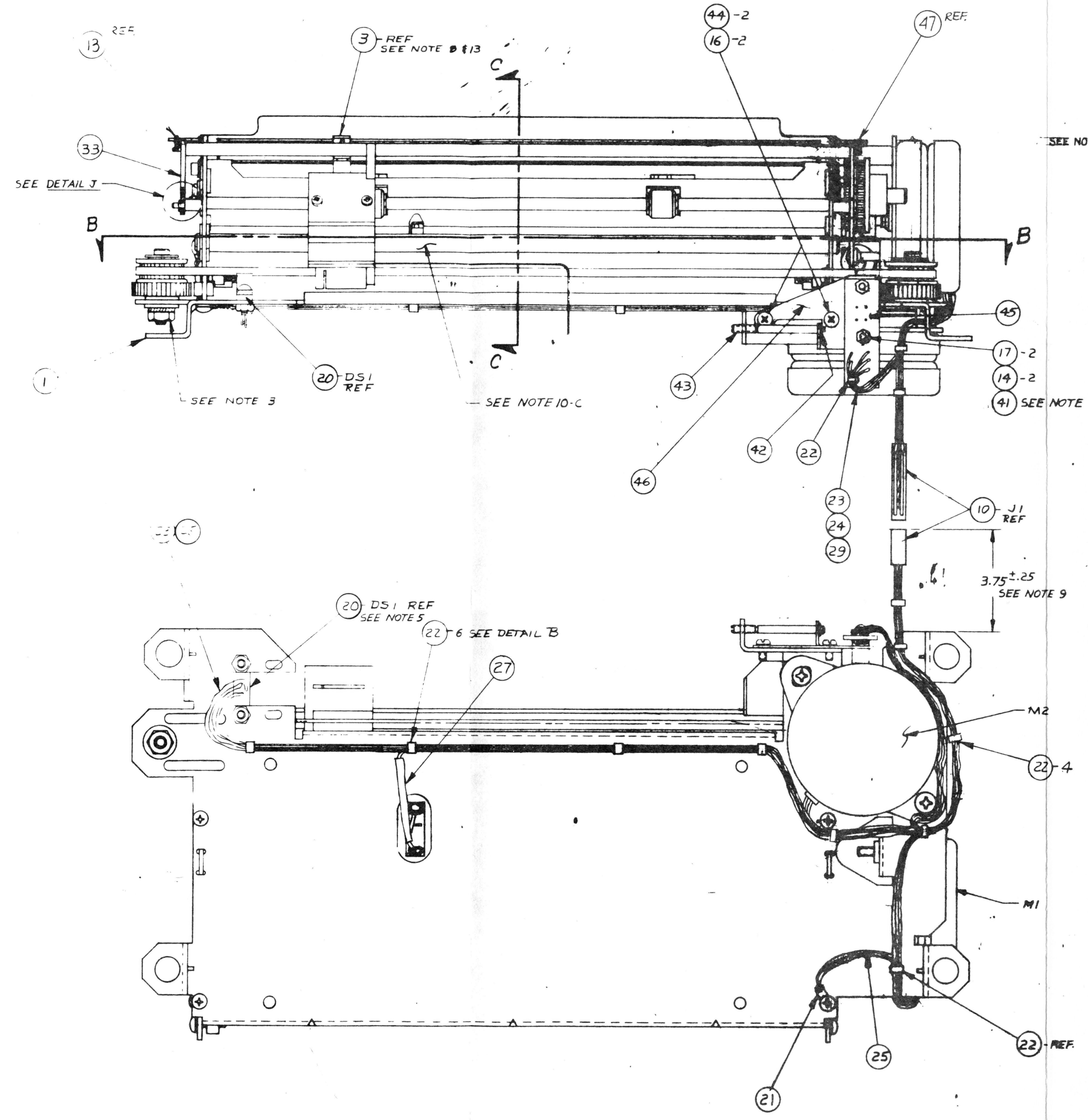
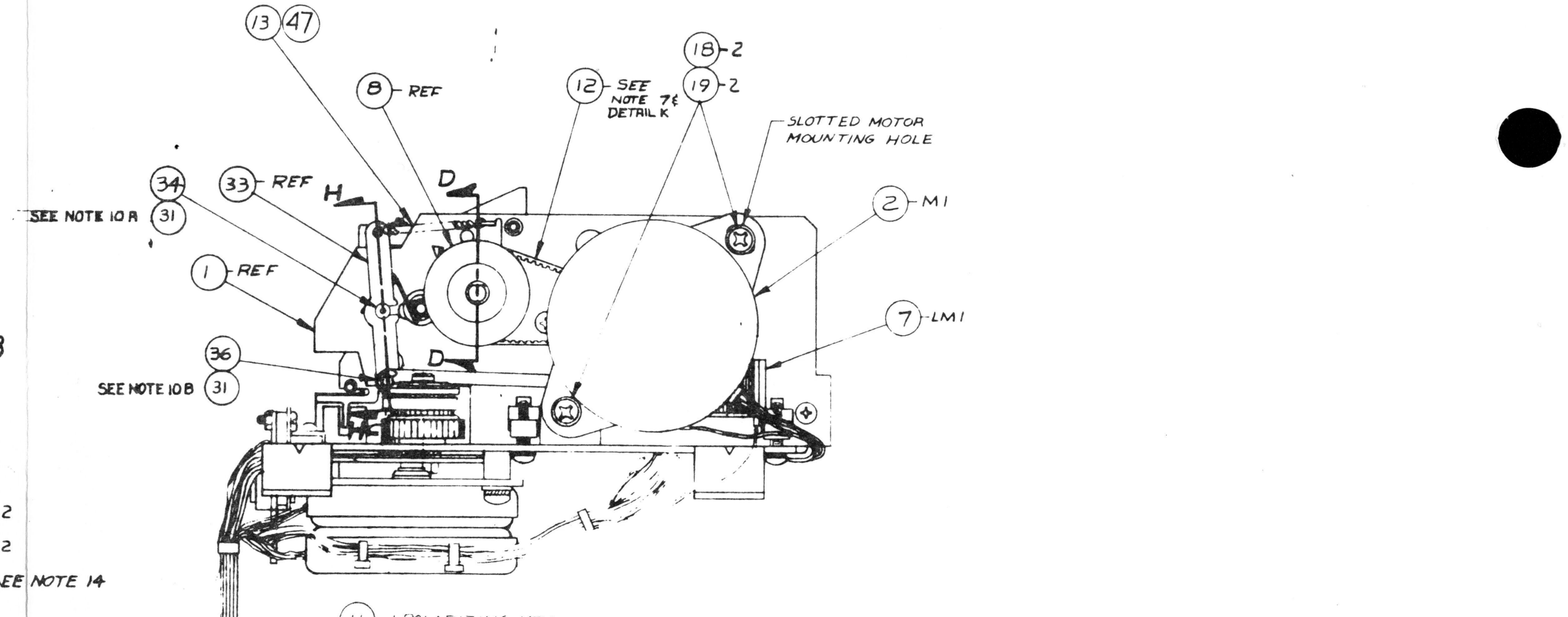
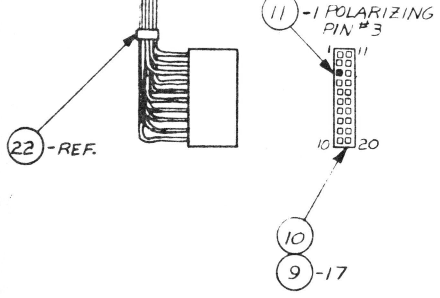

+5V
INTØ(1)
74C14
10
Z11
11
R24
100K
CR10
1N270
74C14
12
Z11
13
R4
4.7K
R5
4.7K
R7
4.7K
C29
1000PF
C32
1000 PF
74C14
8
Z11
9
P1-2(1)
INT1 (1)
P1-7(1)
P1-6(1)
J4
1 ENCODER
3
11 HOME
13 PAPER OUT
12 SENSOR RETURN
2 SENSOR DRIVE
14 SOLENOID RETURN
4 SOLENOID
7 LF COM
17 LF COM
1Ø CR COM
2Ø CR COM
5 LF Ø1
6 LF Ø2
15 LF Ø3
16 LF Ø4
8 CR Ø1
9 CR Ø2
18 CR Ø3
19 CR Ø4
+5V MOTOR
14
1,9
CR1
1N4749
+17V
15
16
3
2
11
1Ø
6
8
Z5
ULN2069B
4,5,12,13
14
1,9
15
16
3
2
11
1Ø
6
8
Z1Ø
ULN2069B
4,5,12,13
13
Z9
12
9
Z9
8
7407
+13.5V
(SEE NOTE 3)
R18
4.7K
R19
1K
Q1
TIP125
+5V
R6
100Ω
CR2
1N4002
CR3
1N4002
CR5
GP30B
CR7
1N4002
CR4
1N4002
(SEE NOTE 3)
+13.5V
R20
4.7K
R21
1K
Q2
TIP125
+5V MOTOR
CR6
GP30B
C27
1UF
R3 1.3Ω
2W
CR11
1N4002
CR12
1N4002
CR13
1N4002
CR14
1N4002
CR15
1N4002
CR16
1N4002
CR17
1N4002
CR18
1N4002
P1-3(1)
4 RESET
A13 (1)
8 CS
A8(1)
7 IO/M
ADØ(1)
12 ADØ
AD1(1)
13 AD1
AD2(1)
14 AD2
AD3(1)
15 AD3
AD4(1)
16 AD4
AD5(1)
17 AD5
AD6(1)
18 AD6
AD7(1)
19 AD7
Z14
8155
RD(1)
9 RD
WR(1)
1Ø WR
ALE(1)
11 ALE
TIMIN(1)
3 TIMIN
BURN ENA(1)
7407
6
Z9
5
6 TIMEOUT
+5V
4Ø
C14
4.7UF
35V
2Ø
PB7 36
PB6 35
PB5 34
PB4 33
PB3 32
PB2 31
PB1 30
PBØ 29
PA7 28
PA6 27
PA5 26
PA4 25
PA3 24
PA2 23
PA1 22
PAØ 21
PC5 5
PC4 2
PC3 1
PC2 39
PC1 38
PCØ 37
UDN5732M
Z3
Z3
Z4
Z2
Z1
Z1
Z2
Z7
Z7
Z8
Z8
Z4
J3
5 DOT 1
6 DOT 2
7 DOT 3
8 DOT 4
9 DOT 5
1Ø DOT 6
11 DOT 7
12 DOT 8
13 DOT 9
14 DOT 1Ø
15 DOT 11
+13.5V (SEE NOTE 3)
4
16
J1
+5V
3
+5V
C26
15UF
35V
C1-4,6-13,15-20
.01UF
50V
+5V RETURN
4
SENSE RTN
2
R30
23.2K
1/8W ±1%
3 SENSE RTN
C21
.01UF
50V
R1 22K
1 SENSE 1
13.5V ADJ
1
R2 22K
2 SENSE 2
J3
+5V MOTORS
1Ø
+5V MOTOR
+17V
6
+17V
+13.5V
8
+13.5V (SEE NOTE 3)
POWER RETURN
7
C25
47UF
35V
C23
15UF
35V
C10,24
.01UF
50V
POWER RETURN
9
5
LOG GND
PWR GND

Figure 6-8. Printer Control Board Assembly (A7A1) Parts Location and Schematic Diagram (Sheet 3 of 3).


13 REF
3 - REF SEE NOTE 8 & 13
C
44 -2
16 -2
47 REF
33
SEE DETAIL J
B
B
45
17 -2
14 -2
41 SEE NOTE 14
1
SEE NOTE 3
20 DS1 REF
SEE NOTE 10-C
C
43
42
22
46
23
24
29
10 - J1 REF
3.75±.25 SEE NOTE 9
20 DS1 REF SEE NOTE 5
22 -6 SEE DETAIL B
27
M2
22 -4
M1
21
25
22 - REF

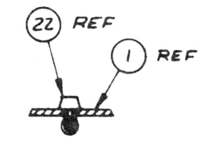

13 47
8 - REF
12 - SEE NOTE 7 & DETAIL K
18 -2
19 -2
SLOTTED MOTOR MOUNTING HOLE
2 - M1
SEE NOTE 10 A 31
34
33 - REF
H
D
1 - REF
7 - LM1
36
SEE NOTE 10 B 31
D


11 -1 POLARIZING KEY PIN # 3
1
10
20
22 - REF
10
9 -17

NOTES:

1. FOR LIST OF MATERIALS SEE A0002 -
2. SEE SHEET 2 OF 2 FOR SECTIONS
3. ALL HARDWARE TO BE TORQUED TO C.D.I. STANDARD SPECIFICATIONS
4. ROUTE ALL LEADS WHERE SHOWN PER REF DES 6 (WIRING DIAGRAM) STRIP LEADS $.12^{+.06}_{-.00}$
5 ~~INSTALL 1/2 ± 1/32 HEAT SHRINK TUBING, (REF DES 39) ON WIRES TO BE ATTACHED TO DS1 & DS2 OPTICAL SWITCH LEADS (REF DES 20 & 21) AFTER LEADS HAVE BEEN SOLDERED. PLACE REF DES 30 OVER THE CONNECTION AND SHRINK AS REQUIRED.~~

6. ORIENT REF DES 8 (PULLEY), SO THAT THE SET SCREW IS PERPENDICULAR TO THE FLAT ON THE DRIVE SHAFT. SECURE REF DES 15 (SETSCREW) PER NOTE 3.
7. INSTALL REF DES 12 (LINE FEED TIMING BELT), AS FOLLOWS
   A. LOOSEN REF DES 19 (MOUNTING SCREWS) ON REF DES 2 (MOTOR).
   B. PLACE REF DES 12 (TIMING BELT) OVER LINE FEED MOTOR PULLEY AND REF DES 8 (LINE FEED DRIVE PULLEY).
   C. SWIVEL REF DES 2 (MOTOR) UNTIL REF DES 12 (BELT) IS FULLY ENGAGED WITH THE GROOVES IN THE PULLEYS, TIGHTEN REF DES 19 (SCREWS) PER NOTE 3. TIMING BELT (REF DES 12) SHOULD DEFLECT NO MORE THAN .045" WHEN A 1 OZ. FORCE IS APPLIED. SEE DETAIL K.
8. INSTALL REF DES 3 (PRINT HEAD ASS'Y) AND ROUTE FLEX CABLE AS SHOWN IN DETAIL G. ADJUST PRINT HEAD USING PROCEDURE A0006-06554
9 PRINTER CABLE TO BE DRESSED TO EXTEND TO 3.75 INCHES FROM PRINTER FRAME.
10. LUBRICATE AS FOLLOWS:
   A. APPLY A SMALL AMOUNT OF DAMPING GREASE REF DES 48, TO EACH PIVOT PIN WHERE THE HEAD LOADING BAR REF DES 33 IS FASTENED TO THE PRINTER FRAME. SEE SECTION H-H AND DETAIL J
   B. APPLY DAMPING GREASE, REF DES 48 TO PIVOTING POINT ON THE SOLENOID LINKAGE, REF DES 4, WHERE SHOWN IN SECTION B-B AND SECTION H-H.
   C. APPLY A VERY LIGHT COAT OF OIL (REF DES 31) TO CARRIAGE SHAFT USING A "HANDIWIPE" OR SIMILAR LINT FREE TISSUE.
   D. ALL PARTS DESCRIBED ABOVE ARE TO ROTATE OR SLIDE FREELY AFTER LUBRICATION.
11. AFTER HEAD, HEADLOAD BAR, AND & TENSION SPRING HAVE BEEN INSTALLED (REF. DES. 3, 4, & 30) SET SOLENOID TO DIMENSION SHOWN IN SECTION B-B.
12. ADJUST PAPER GUIDE AND PAPER EXIT TO DIMENSION SHOWN IN SECTION C-C.
13. TO INSURE PROPER PRINTING THERE SHOULD BE 170 TO 190 GRAMS OF PRESSURE HOLDING THE PRINT HEAD AGAINST THE PLATEN.
14. AFTER ADJUSTING ENCODER SENSOR FOR MAXIMUM SPEED (130 CPS) EPOXY SENSOR HARDWARE (REF DES 44) TO FRAME (REF DES 1) USING 5 MINUTE EPOXY (REF DES 41).
15. FOR ALLIGNMENT PROCEDURE SEE A0006-06554.



DETAIL "B"

Figure 6-9. Plotting Printer Assembly (A7A2) Parts Location and Wiring Diagram (Sheet 1 of 5).

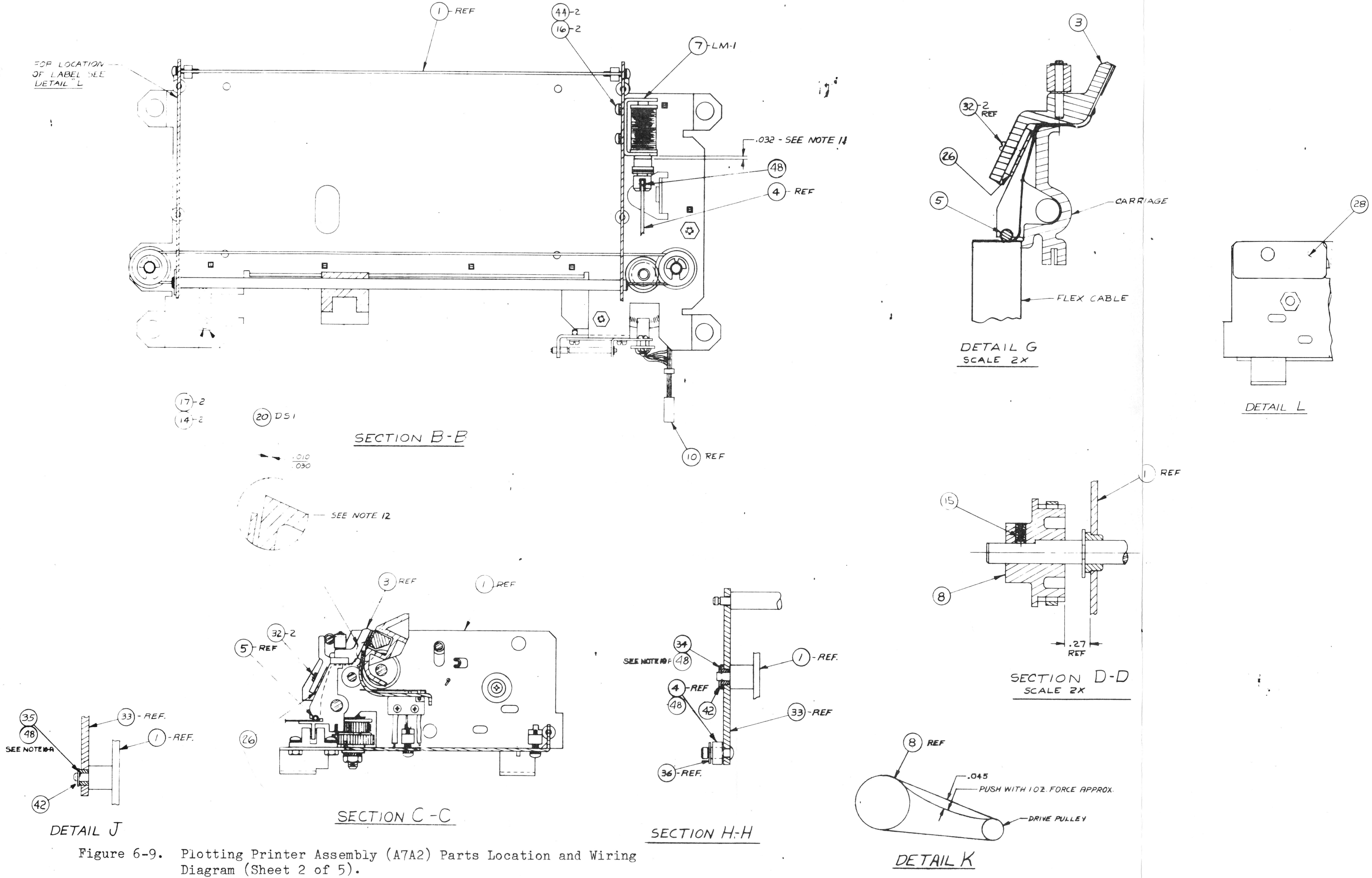
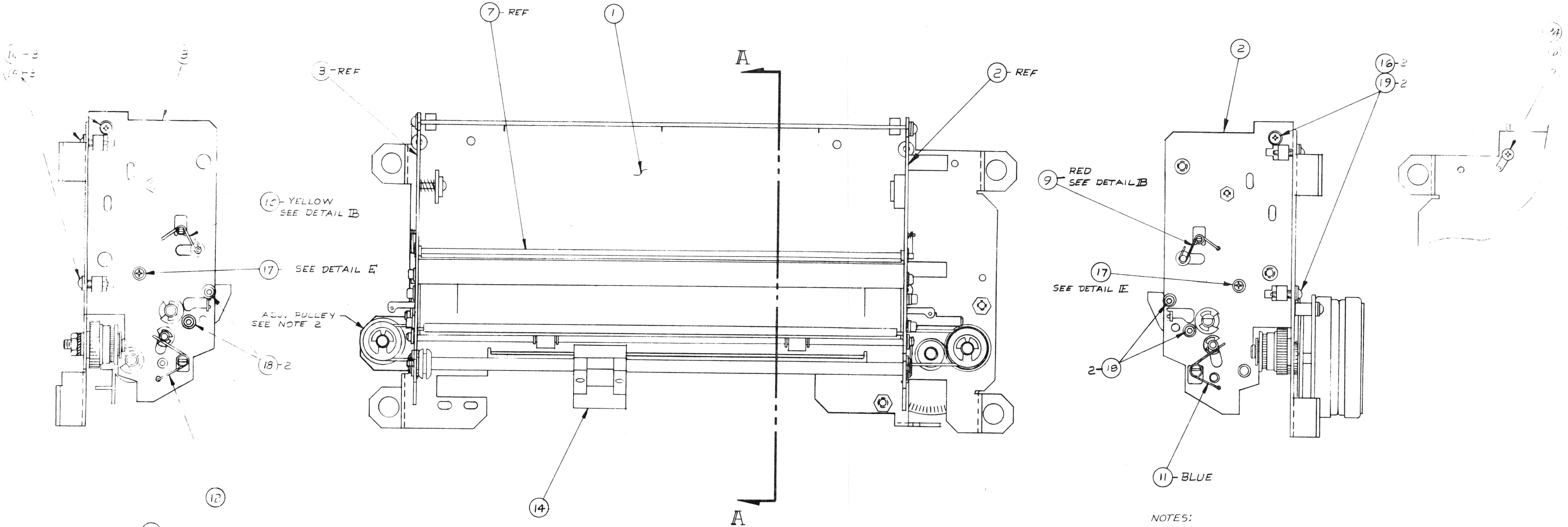
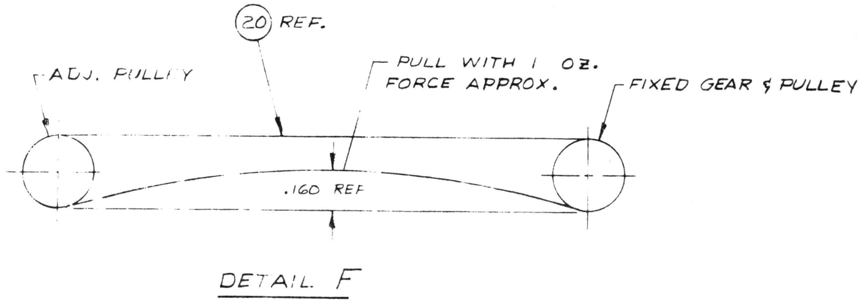

FOR LOCATION OF LABEL SEE DETAIL "L"
1 - REF
44 - 2
16 - 2
7 - LM-1
.032 - SEE NOTE 11
48
4 - REF
17 - 2
14 - 2
20 DS1
10 REF
SECTION B-B
.010
.030
SEE NOTE 12
3
32 - 2 REF
26
5
CARRIAGE
FLEX CABLE
DETAIL G
SCALE 2X
28
DETAIL L
1 REF
15
8
.27 REF
SECTION D-D
SCALE 2X
3 REF
1 REF
32 - 2
5 - REF
26
SECTION C-C
35
48
SEE NOTE 10-A
33 - REF.
1 - REF.
42
DETAIL J
34
SEE NOTE 10-F 48
4 - REF
48
42
1 - REF.
33 - REF
36 - REF.
SECTION H-H
8 REF
.045
PUSH WITH 1 OZ. FORCE APPROX.
DRIVE PULLEY
DETAIL K

Figure 6-9. Plotting Printer Assembly (A7A2) Parts Location and Wiring Diagram (Sheet 2 of 5).


7 - REF
1
3 - REF
A
2 - REF
2
16 - 2
19 - 2
15 - YELLOW
SEE DETAIL B
9 - RED
SEE DETAIL B
17 - SEE DETAIL E
17
SEE DETAIL E
ADJ. PULLEY
SEE NOTE 2
18 - 2
2 - 18
11 - BLUE
12
14
A

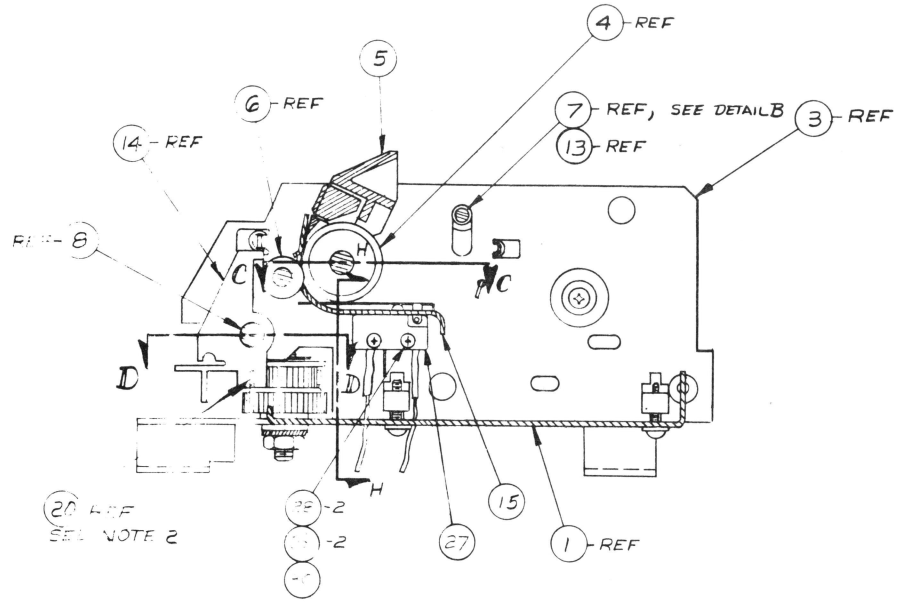

20 REF.
ADJ. PULLEY
PULL WITH 1 OZ.
FORCE APPROX.
FIXED GEAR & PULLEY
.160 REF

DETAIL F

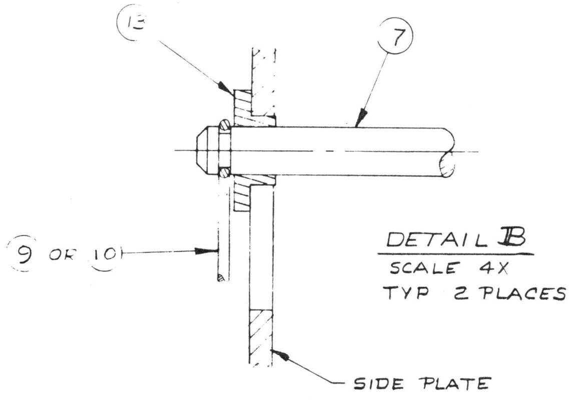
NOTES:

1. FOR LIST OF MATERIALS SEE A0002-06572.
2. INSTALL THE CARRIAGE DRIVE TIMING BELT AS FOLLOWS:
   - A. LOOSEN NUT ON ADJUSTABLE PULLEY ON THE BASE, REF DES 1.
   - B. INSTALL TIMING BELT (REF DES #20) OVER PULLEYS AS SHOWN.
   - C. PLACE BELT INTO SLOT PROVIDED IN THE CARRIAGE (REF DES 14), MAKE SURE BELT IS FULLY INSERTED INTO THE SLOT, SEE SECTION A-A.
   - D. TAKE UP BELT BY SLIDING ADJUSTABLE PULLEY TO THE LEFT UNTIL THERE IS APPROX. .16 INCHES OF SLACK ON BELT WITH 1OZ OF FORCE, SEE DETAIL F. THE BELT IS ALWAYS TO HAVE SOME DEFLECTION, DO NOT OVER TIGHTEN.
3. ALL HARDWARE TO BE FASTENED USING STANDARD C.D.I. MFG TORQUE SPECIFICATIONS.
4. USING A TOOTHPICK OR SIMILAR INSTRUMENT APPLY ONE DROP OF SPINDLE OIL (REF DES 25) TO THE SHAFT (REF DES 4). ASSEMBLE SHAFT (REF DES 4) TO BUSHINGS. SHAFT SHOULD TURN EASILY AFTER ASSEMBLY.

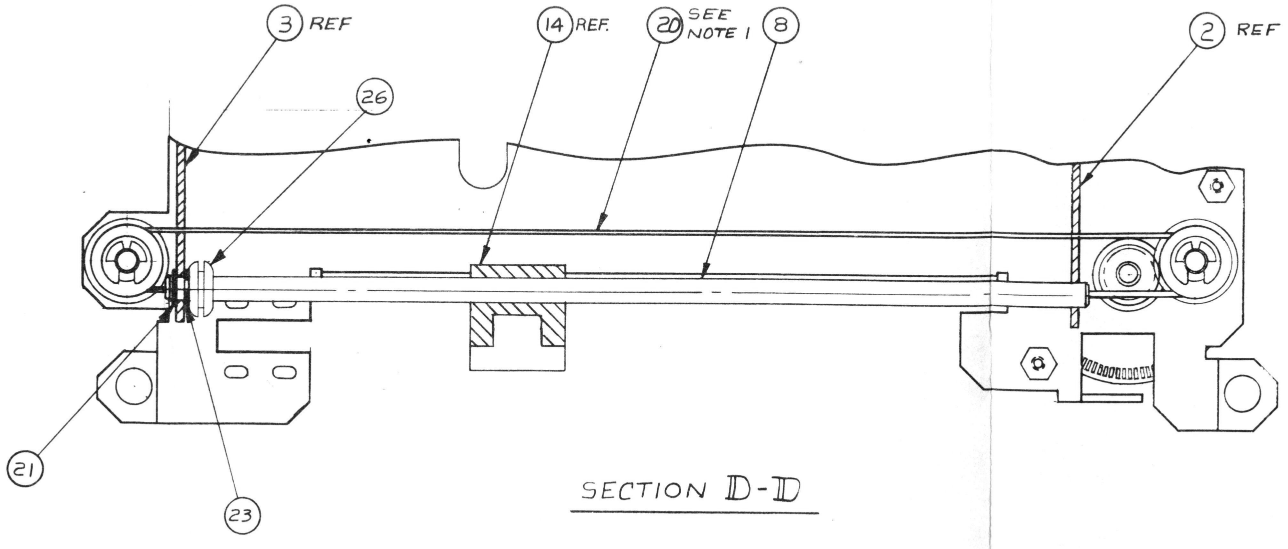
Figure 6-9. Plotting Printer Assembly (A7A2) Parts Location and Wiring Diagram (Sheet 3 of 5).


4 -REF
5
6 -REF
7 -REF, SEE DETAIL B
3 -REF
13 -REF
14 - REF
REF- 8
C
C
D
H
20 REF
SEE NOTE 2
25 -2
-2
27
15
1 -REF

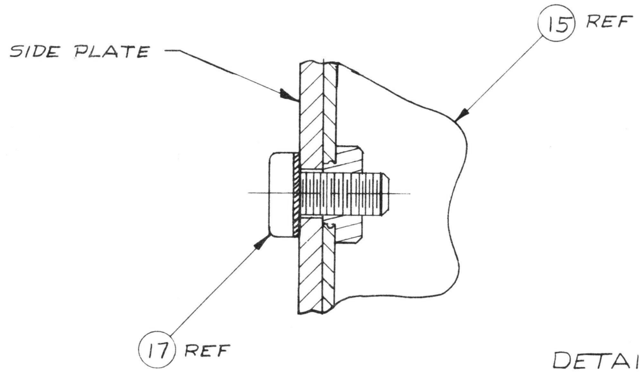
SECTION A-A


13
7
9 OR 10
SIDE PLATE

DETAIL B
SCALE 4X
TYP 2 PLACES

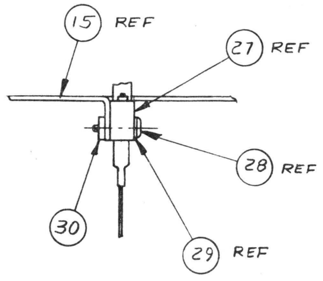

3 REF
14 REF
20 SEE NOTE 1
8
2 REF
26
21
23

SECTION D-D

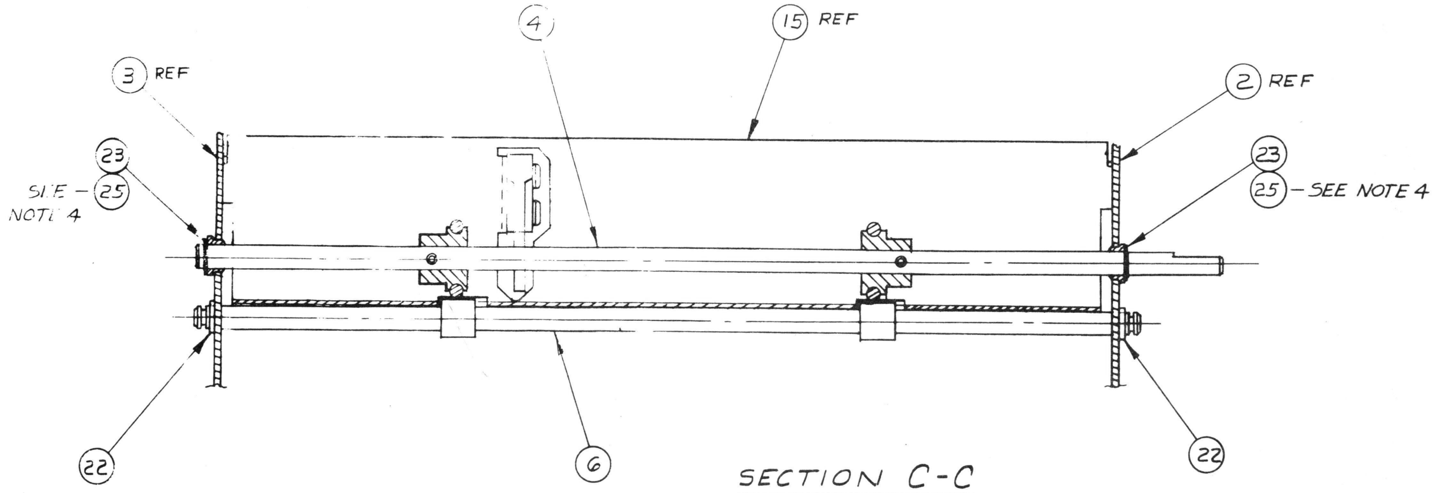

SIDE PLATE
15 REF
17 REF

DETAIL E

SCALE 4X
TYP 2 PLACES

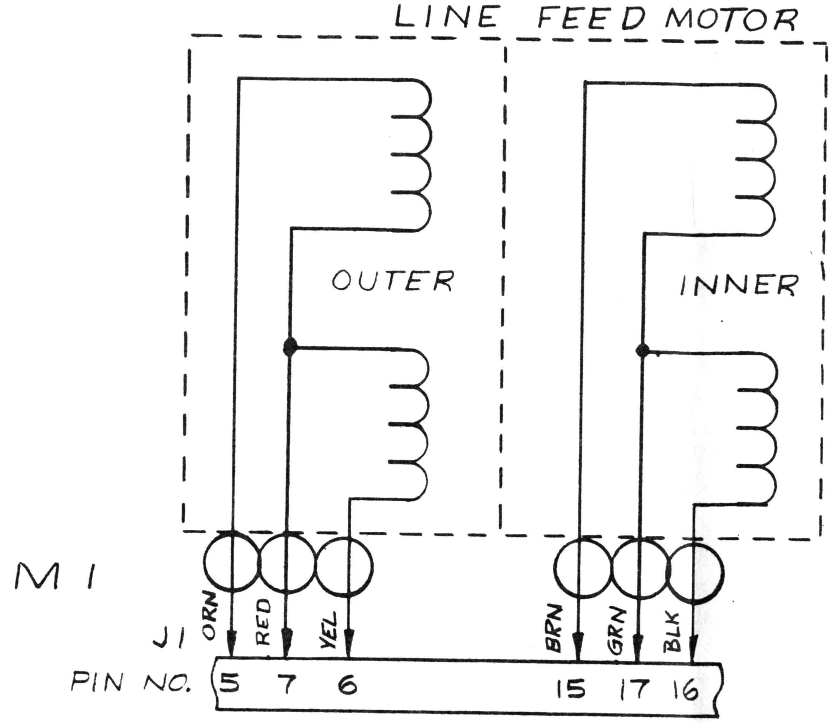

15 REF
27 REF
28 REF
30
29 REF

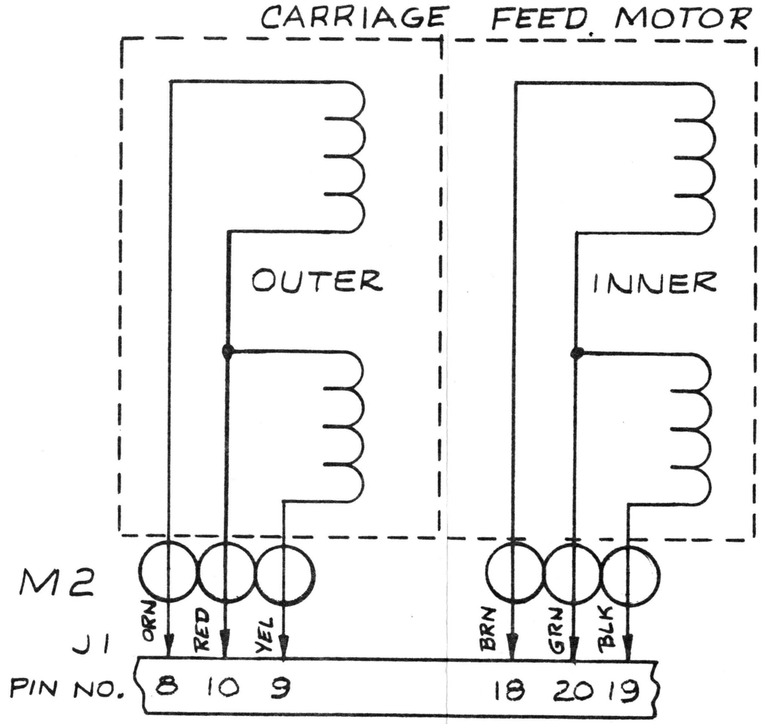
VIEW H-H

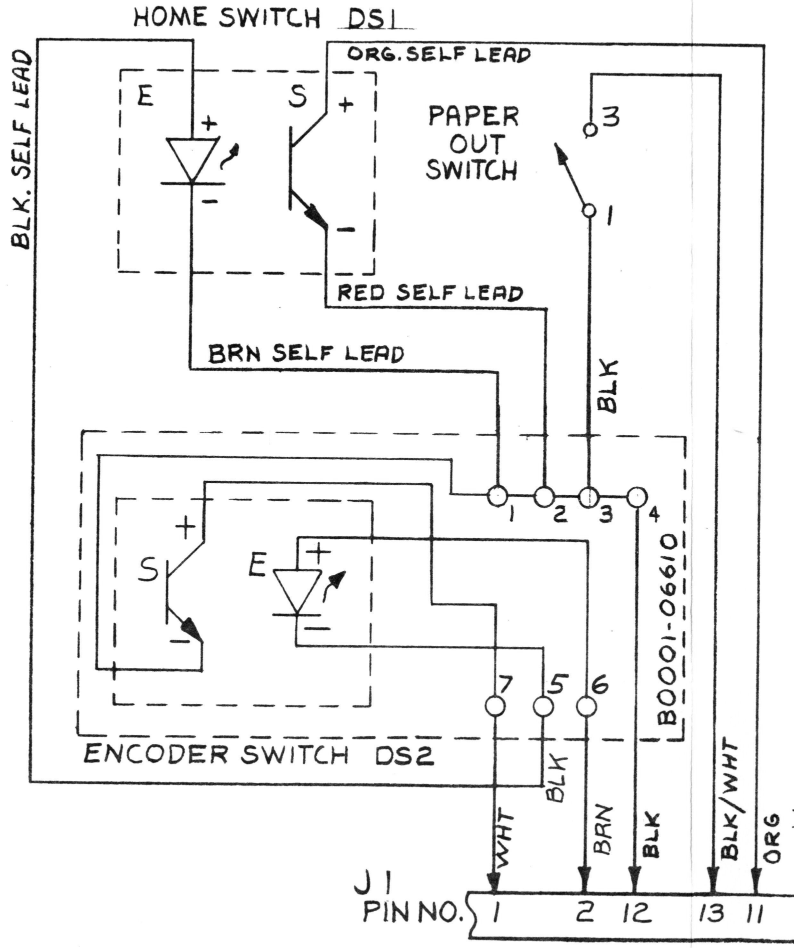

3 REF
4
15 REF
2 REF
23
SEE NOTE 4 - 25
23
25 - SEE NOTE 4
22
6
22

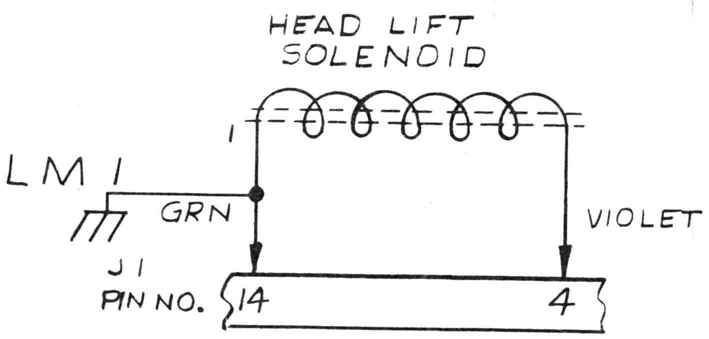
SECTION C-C
ROTATED 90°

Figure 6-9. Plotting Printer Assembly (A7A2) Parts Location and Wiring Diagram (Sheet 4 of 5).


LINE FEED MOTOR
OUTER
INNER
M 1
J1
PIN NO.
ORN
RED
YEL
BRN
GRN
BLK
5 7 6
15 17 16


CARRIAGE FEED MOTOR
OUTER
INNER
M2
J1
PIN NO.
ORN
RED
YEL
BRN
GRN
BLK
8 10 9
18 20 19


HOME SWITCH DS1
BLK. SELF LEAD
ORG. SELF LEAD
E
S
+
-
PAPER OUT SWITCH
3
1
RED SELF LEAD
BRN SELF LEAD
BLK
1 2 3 4
S
E
7 5 6
B0001-06610
ENCODER SWITCH DS2
BLK
WHT
BRN
BLK
BLK/WHT
ORG
J1
PIN NO.
1 2 12 13 11


HEAD LIFT SOLENOID
LM 1
1
GRN
VIOLET
J1
PIN NO.
14
4

NOTES:

1. POLORIZING KEY TO GO IN POSITION 3 ON J1.

Figure 6-9. Plotting Printer Assembly (A7A2) Parts Location and Wiring Diagram (Sheet 5 of 5).

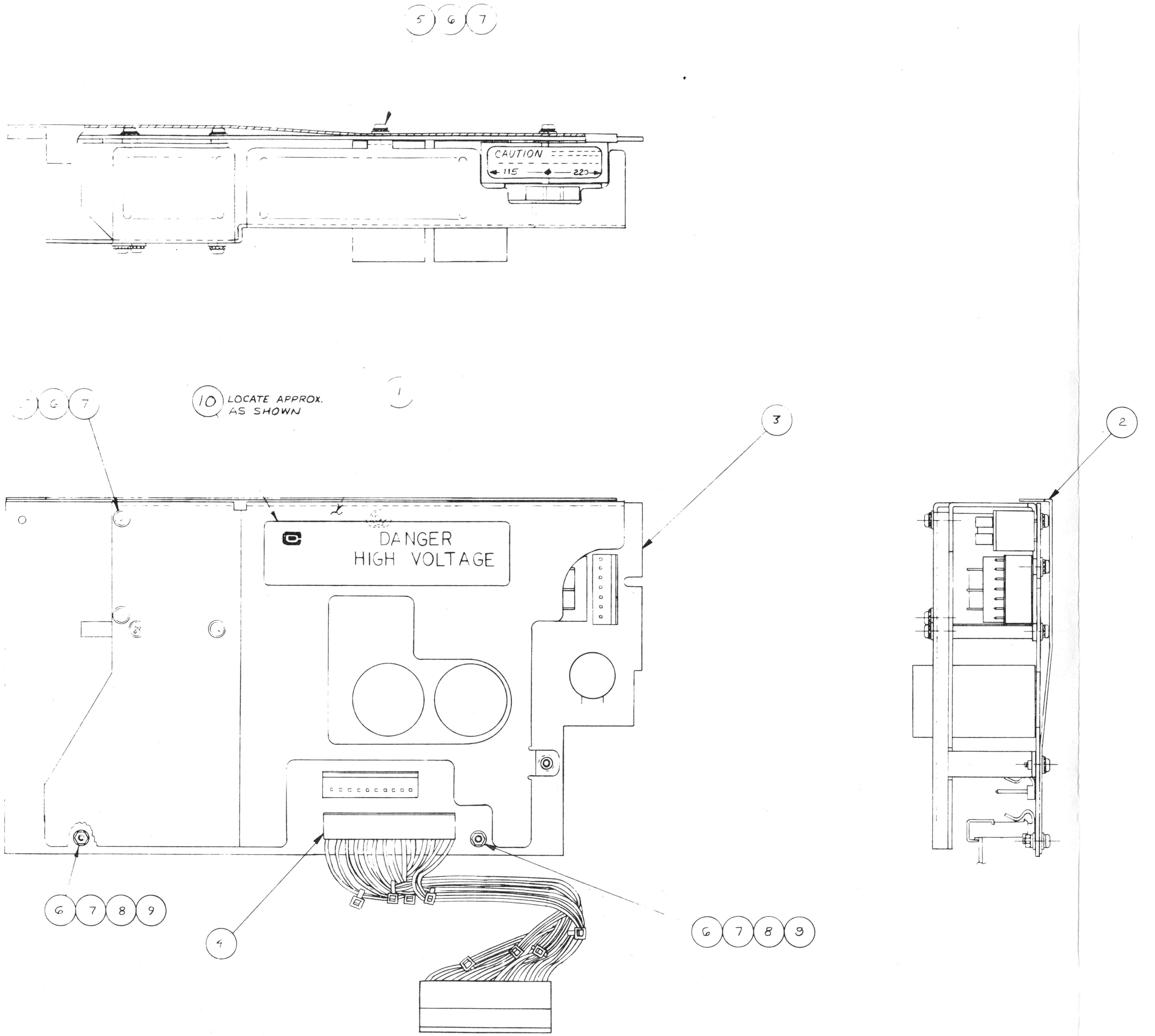

5 6 7
CAUTION
115
220
5 6 7
10 LOCATE APPROX. AS SHOWN
1
3
2
DANGER
HIGH VOLTAGE
6 7 8 9
4
6 7 8 9

Figure 6-10. Power Supply Assembly (A8) Parts Location and Schematic Diagrams (Sheet 1 of 7).

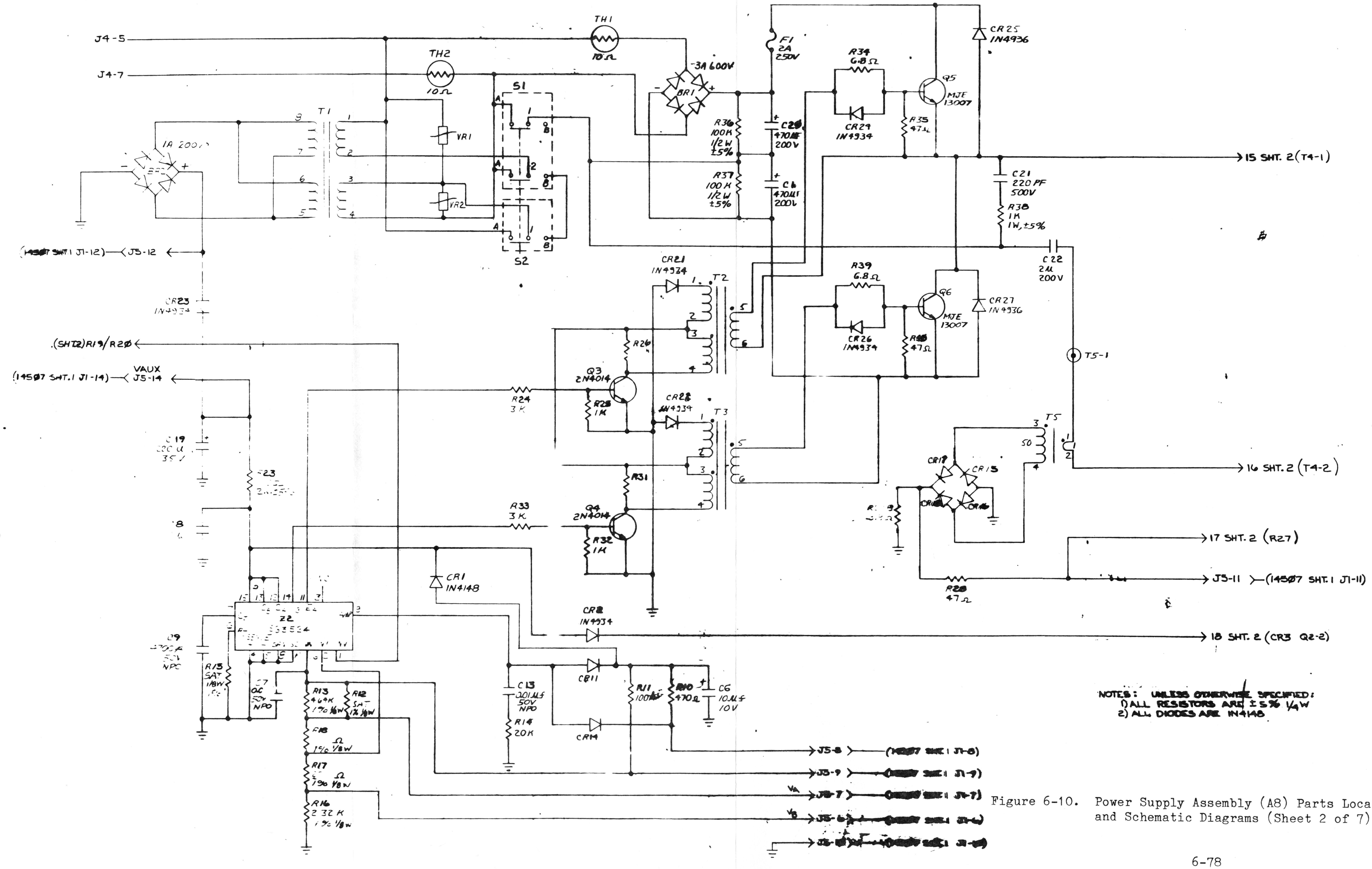
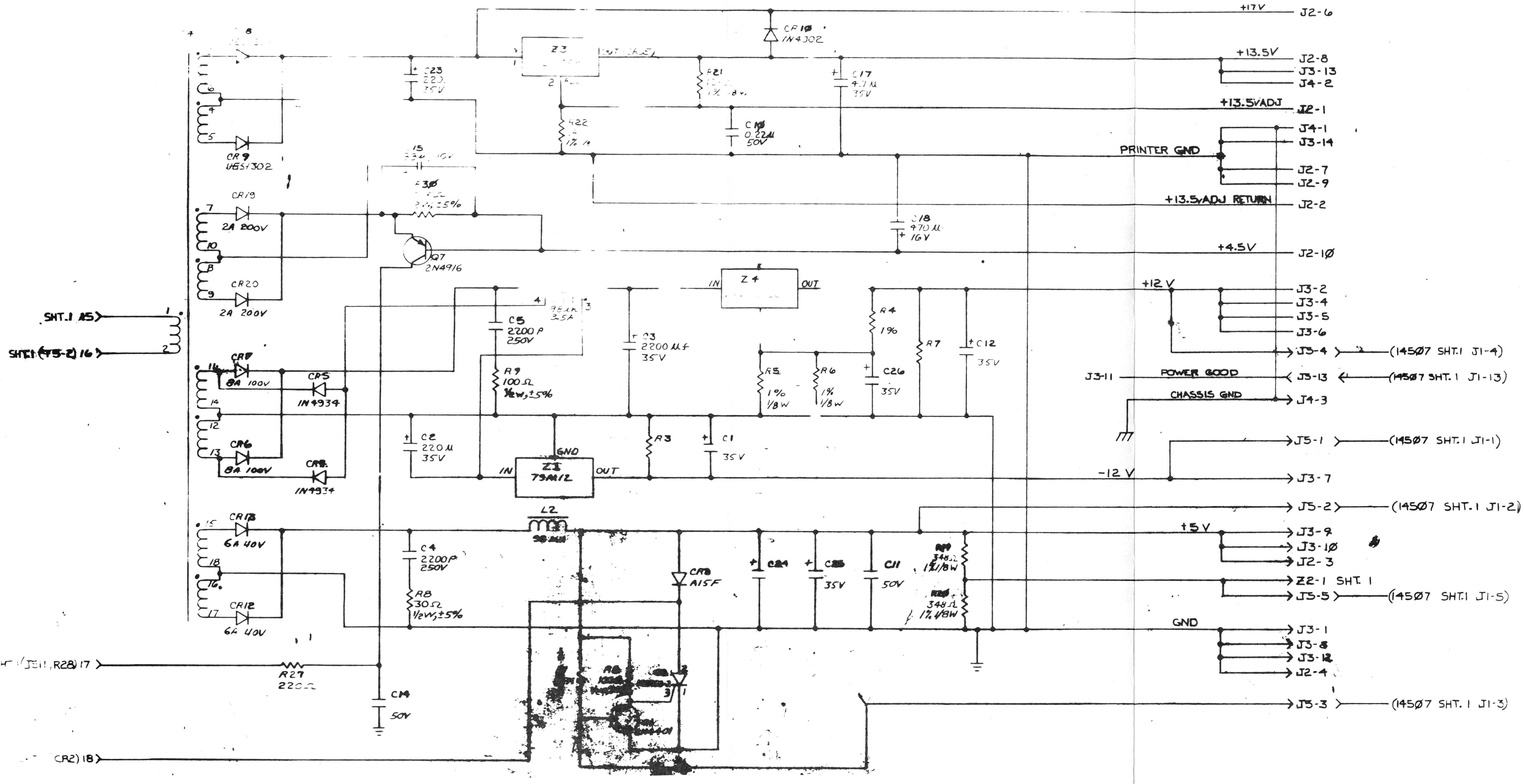
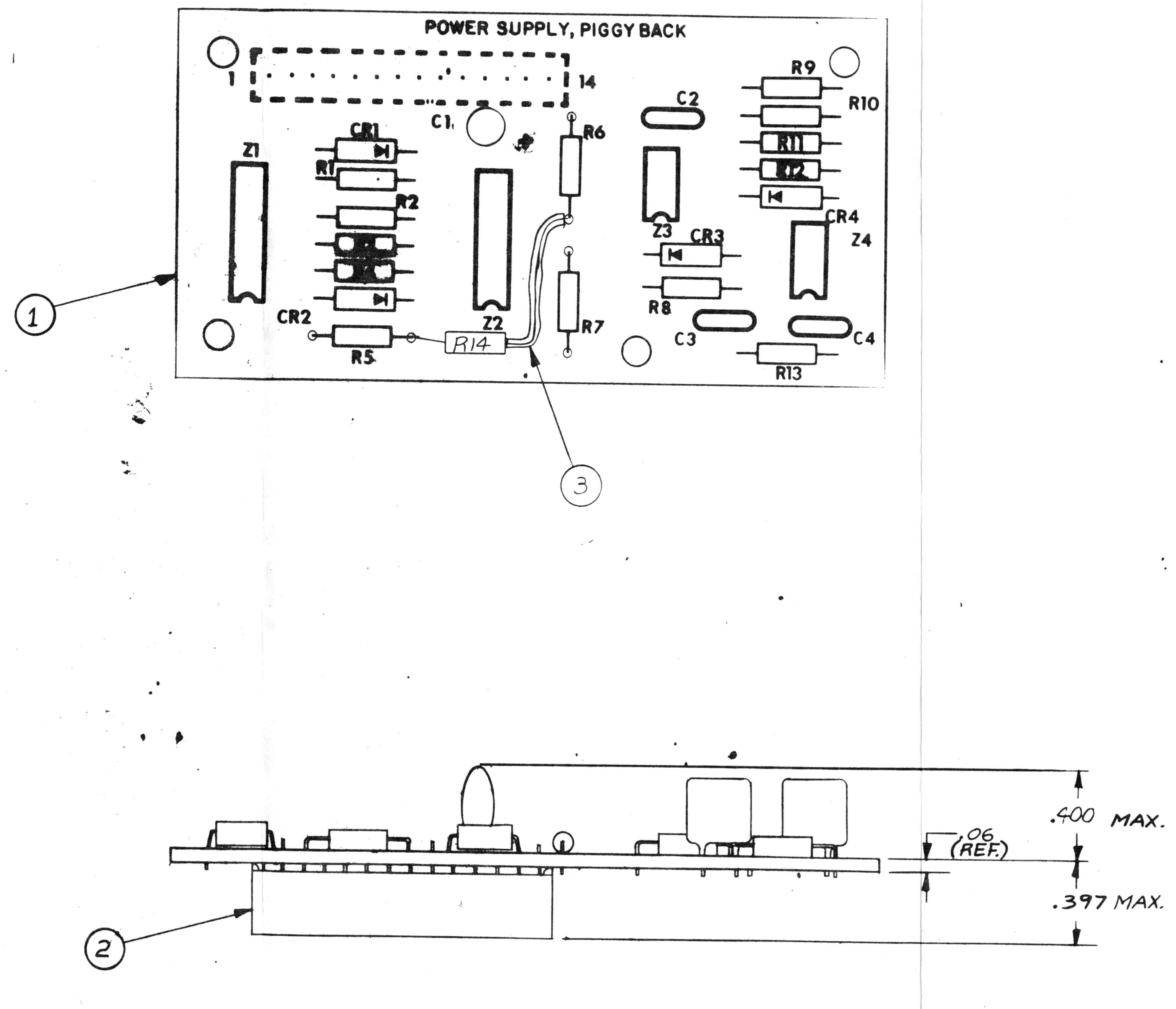

J4-5
J4-7
TH1
10Ω
TH2
10Ω
-3A 600V
BR1
S1
S2
T1
1A 200V
BR2
VR1
VR2
F1
2A
250V
R34
6.8Ω
CR29
1N4934
Q5
MJE
13007
R35
47Ω
CR25
1N4936
R36
100K
1/2W
±5%
R37
100K
1/2W
±5%
C20
470µF
200V
C6
470µF
200V
15 SHT. 2 (T4-1)
C21
220PF
500V
R38
1K
1W, ±5%
C22
2µ
200V
(14507 SHT.1 J1-12)—⟨ J5-12
CR23
1N4934
(SHT2) R19/R20
VAUX
(14507 SHT.1 J1-14)—⟨ J5-14
CR21
1N4934
T2
R26
Q3
2N4014
R24
3K
R25
1K
CR22
1N4934
T3
R31
Q4
2N4014
R33
3K
R32
1K
R39
6.8Ω
CR26
1N4934
Q6
MJE
13007
R40
47Ω
CR27
1N4936
T5-1
T5
16 SHT. 2 (T4-2)
CR17
CR15
17 SHT. 2 (R27)
J5-11 ⟩—(14507 SHT.1 J1-11)
R28
47Ω
C19
220µ
35V
R23
Z2
SG3524
CR1
1N4148
CR8
1N4934
18 SHT. 2 (CR3 Q2-2)
C9
R15
C7
NPO
R13
R12
R18
1% 1/8W
R17
1% 1/8W
R16
2.32K
1% 1/8W
C13
.001µF
50V
NPO
R14
20K
CR11
CR14
R11
100K
R10
470Ω
C6
10µF
10V
J5-8
J5-9
VA
J5-7
VB
J5-6
NOTES: UNLESS OTHERWISE SPECIFIED:
1) ALL RESISTORS ARE ±5% 1/4W
2) ALL DIODES ARE 1N4148

Figure 6-10. Power Supply Assembly (A8) Parts Location and Schematic Diagrams (Sheet 2 of 7).



+17V
J2-6
CR10
1N4002
Z3
+13.5V
J2-8
J3-13
J4-2
C23
220
35V
R21
1% 1/8W
C17
4.7µ
35V
+13.5VADJ
J2-1
R22
1%
C10
0.22µ
50V
J4-1
J3-14
PRINTER GND
J2-7
J2-9
CR9
UES1302
C15
R30
2W, ±5%
+13.5VADJ RETURN
J2-2
CR19
2A 200V
C18
470µ
16V
Q7
2N4916
+4.5V
J2-10
CR20
2A 200V
Z4
IN
OUT
+12 V
J3-2
J3-4
J3-5
J3-6
SHT.1 (T5) 15
SHT.1 (T5-2) 16
C5
2200P
250V
C3
2200µf
35V
R4
1%
R7
C12
35V
J3-4
(14507 SHT.1 J1-4)
CR7
8A 100V
CR5
1N4934
R9
100Ω
½W, ±5%
R5
1%
1/8W
R6
1%
1/8W
C26
35V
J3-11
POWER GOOD
J3-13
(14507 SHT.1 J1-13)
CHASSIS GND
J4-3
C2
220µ
35V
R3
C1
35V
J5-1
(14507 SHT.1 J1-1)
CR6
8A 100V
CR8
1N4934
GND
Z1
79M12
IN
OUT
-12 V
J3-7
J5-2
(14507 SHT.1 J1-2)
L2
CR13
6A 40V
C4
2200P
250V
CR11
A15F
C24
C25
35V
C11
50V
R19
348Ω
1% 1/8W
+5 V
J3-9
J3-10
J2-3
Z2-1 SHT. 1
J5-5
(14507 SHT.1 J1-5)
R8
30Ω
½W, ±5%
R20
348Ω
1% 1/8W
CR12
6A 40V
GND
J3-1
J3-8
J3-12
J2-4
SHT.1 (J5-11, R28) 17
R27
220Ω
C14
50V
J5-3
(14507 SHT. 1 J1-3)
CR2) 18

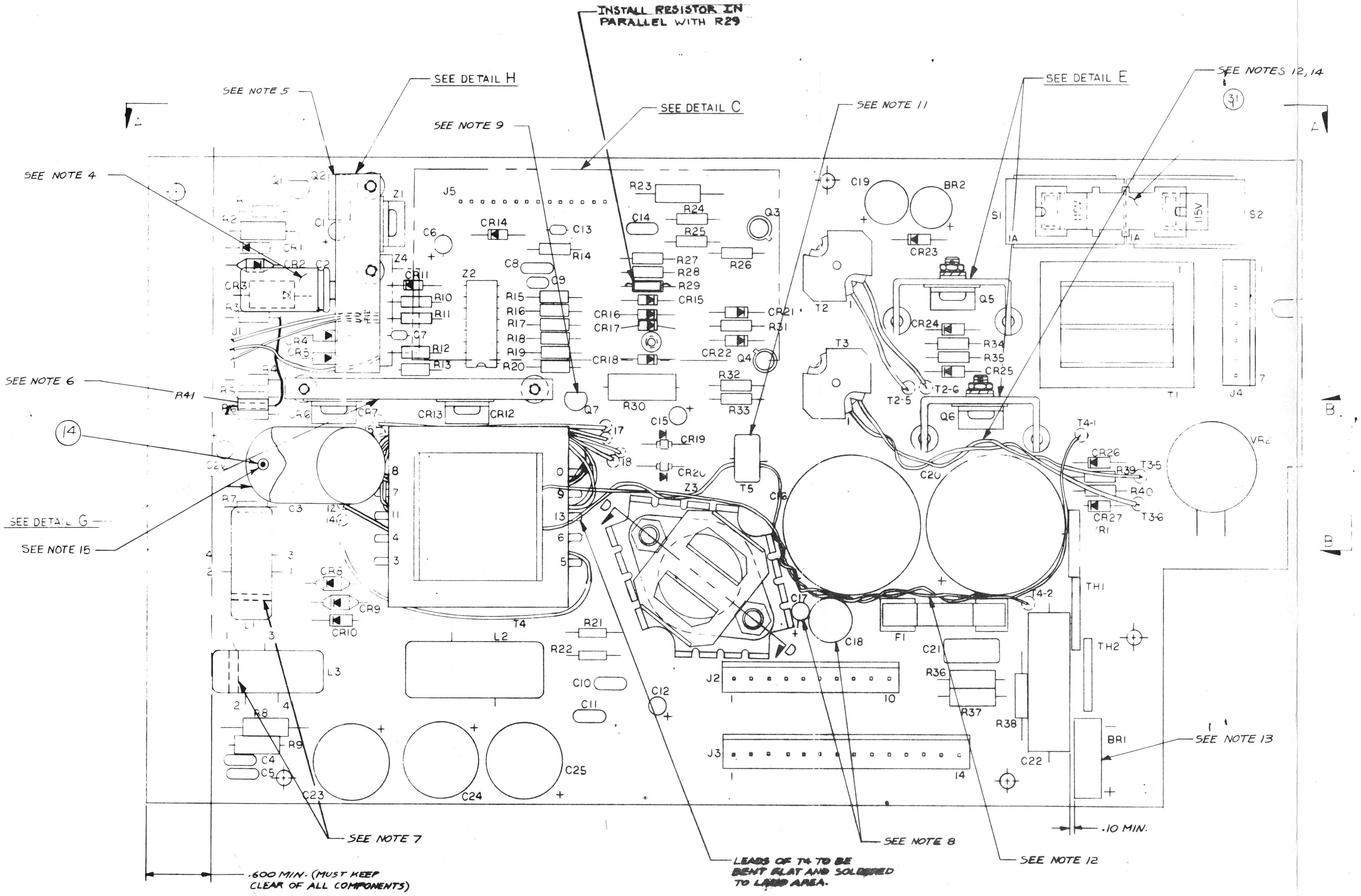
Figure 6-10. Power Supply Assembly (A8) Parts Location and Schematic Diagrams (Sheet 3 of 7).


POWER SUPPLY, PIGGY BACK
1
14
C1
C2
R9
R10
R11
R12
CR4
Z4
CR1
R1
R2
Z1
Z2
R6
R7
Z3
CR3
R8
C3
C4
R13
CR2
R5
R14
1
3
.400 MAX.
.06 (REF.)
.397 MAX.
2

NOTES:

1. FOR LIST OF MATERIALS SEE A0002-14507.
2. FOR CIRCUIT SCHEMATIC SEE D0003-14507.

Figure 6-10. Power Supply Assembly (A8) Parts Location and Schematic Diagrams (Sheet 4 of 7).


INSTALL RESISTOR IN PARALLEL WITH R29
SEE NOTE 5
SEE DETAIL H
SEE DETAIL C
SEE NOTE 9
SEE NOTE 11
SEE DETAIL E
SEE NOTES 12, 14
31
SEE NOTE 4
SEE NOTE 6
R41
14
SEE DETAIL G
SEE NOTE 15
A
B
J5
J4
J2
J3
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Z1
Z2
Z3
Z4
C1
C2
C3
C6
C7
C8
C9
C10
C11
C12
C13
C14
C15
C16
C17
C18
C19
C20
C21
C22
C23
C24
C25
CR1
CR2
CR3
CR4
CR5
CR6
CR7
CR8
CR9
CR10
CR11
CR12
CR13
CR14
CR15
CR16
CR17
CR18
CR19
CR20
CR21
CR22
CR23
CR24
CR25
CR26
CR27
R2
R3
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
R17
R18
R19
R20
R21
R22
R23
R24
R25
R26
R27
R28
R29
R30
R31
R32
R33
R34
R35
R36
R37
R38
R39
R40
T1
T2
T3
T4
T5
T2-5
T2-6
T3-5
T3-6
T4-1
T4-2
L1
L2
L3
BR1
BR2
S1
S2
115V
F1
TH1
TH2
VR2
SEE NOTE 13
SEE NOTE 7
SEE NOTE 8
SEE NOTE 12
.10 MIN.
LEADS OF T4 TO BE BENT FLAT AND SOLDERED TO LAND AREA.
.600 MIN. (MUST KEEP CLEAR OF ALL COMPONENTS)

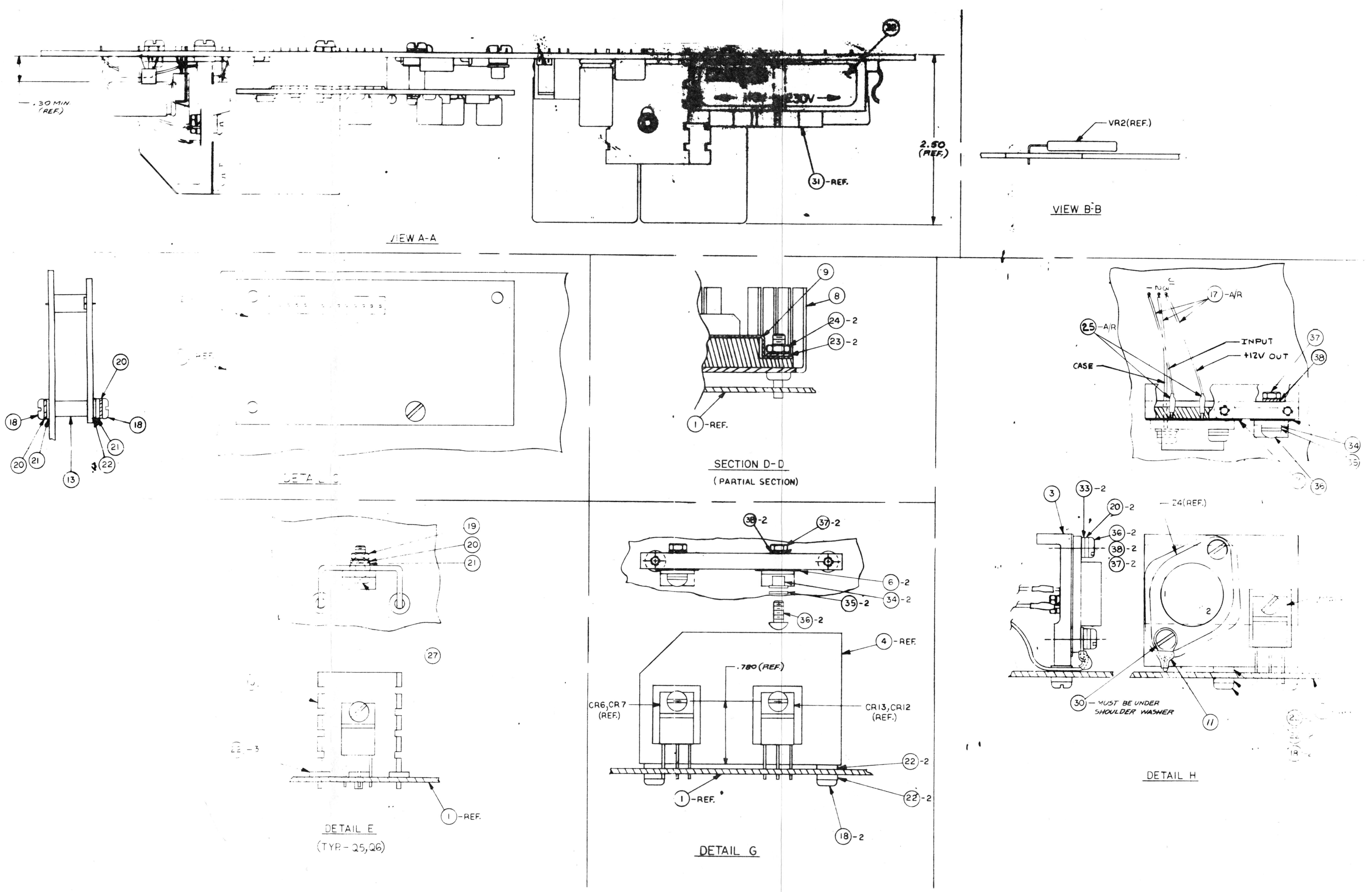
NOTES:

1. FOR LIST OF MATERIALS SEE A0002-1450
2. FOR CIRCUIT SCHEMATIC SEE D0003-1450
3. ~~FOR TEST PROCEDURE SEE 0007~~
4. PUT #22 GA TEFLON SLEEVING (REF. DES. 15) .25 LONG ON EACH LEAD OF C2 AND BEND C2 DOWN AWAY FROM HEATSINK AND RTV (REF. DES. 29) IN PLACE.
5. BEND Q2 AWAY FROM HEATSINK TO PREVENT ELECTRICAL SHORTING. (MIN. .25 IN)
6. REMOVE GROUND LEAD OF R6 AND CONNECT R41 IN SERIES WITH IT. RUN OTHER SIDE OF R41 TO R3 AS SHOWN. PUT #22 TEFLON SLEEVING (REF. DES. 15) OVER LEADS OF R41 AND RTV (REF. DES. 29) IN PLACE.
7. BAND OF L1,3 IS IN POSITION SHOWN.
8. BEND C17 AND C18 AWAY FROM HEATSINK OF Z3
9. BEND Q7 AWAY FROM HEATSINK.
10. ~~CUT RUN FROM LEFT SIDE OF R23 TO R26 AS SHOWN AND ADD #24 BUSSWIRE (REF. DES. 2) AND #22 TEFLON TUBING (REF. DES. 15) FROM R26 LEFT SIDE TO RIGHT SIDE OF R23 AS SHOWN.~~
11. PUT RTV (REF. DES. 29) UNDER T5 TO HOLD COMPONENT TO BOARD.
12. TWIST LEADS AS SHOWN IN LOCATION SPECIFIED. (APPROX 1 TURN PER INCH)
13. PUT 1/8" LONG #16 TEFLON TUBING (REF. DES. 11) OVER "+" AND "-" LEADS OF BR1.
14. TRANSFORMER (T3) LEAD 1 IS MARKED PER CDI SPEC A0010-14543

NOTES CON'T

15. INSTALL 3/16" LENGTH OF CLEAR TEFLON TUBING (REF DES. 14) ON POSITIVE LEAD OF CAPACITOR C3. BEND C3 OVER SO IT IS ALMOST CONTACTING CORE OF T4 AND PUT RTV (REF DES 29) BETWEEN C3 AND T4 CORE.

Figure 6-10. Power Supply Assembly (A8) Parts Location and Schematic Diagrams (Sheet 5 of 7).


.30 MIN (REF.)
28
115V
230V
31-REF.
2.50 (REF.)
VR2(REF.)
18
20
21
13
22
9
8
24-2
23-2
1-REF.
17-A/R
25-A/R
INPUT
+12V OUT
CASE
37
38
34
35
36
19
20
21
27
38-2
37-2
6-2
34-2
35-2
36-2
4-REF.
.780 (REF.)
CR6,CR7 (REF.)
CR13,CR12 (REF.)
22-2
18-2
3
33-2
20-2
36-2
38-2
37-2
24(REF.)
2
30 — MUST BE UNDER SHOULDER WASHER
11

VIEW A-A

VIEW B-B

DETAIL C

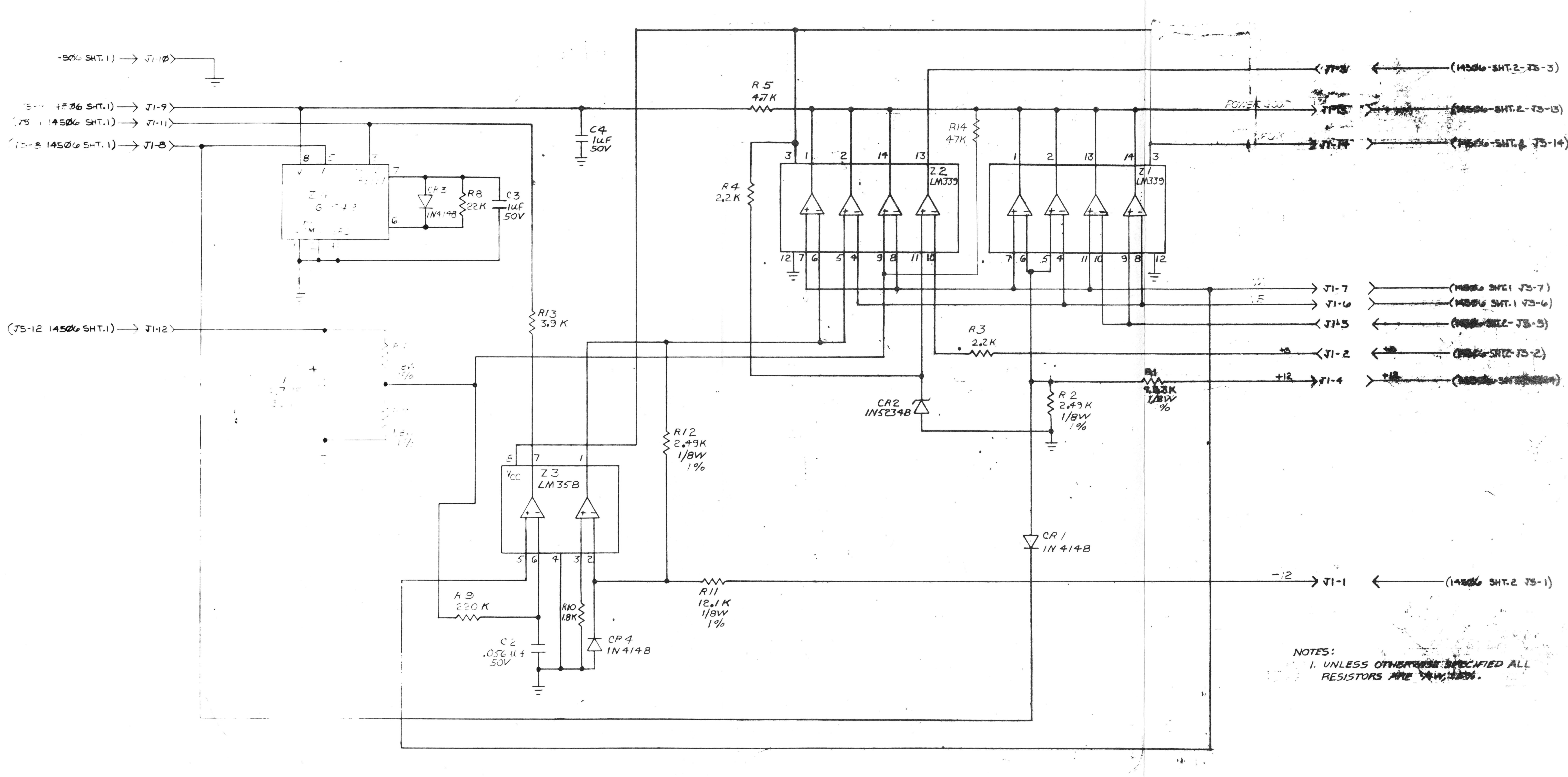
SECTION D-D
(PARTIAL SECTION)

DETAIL E
(TYP-25,26)

DETAIL G

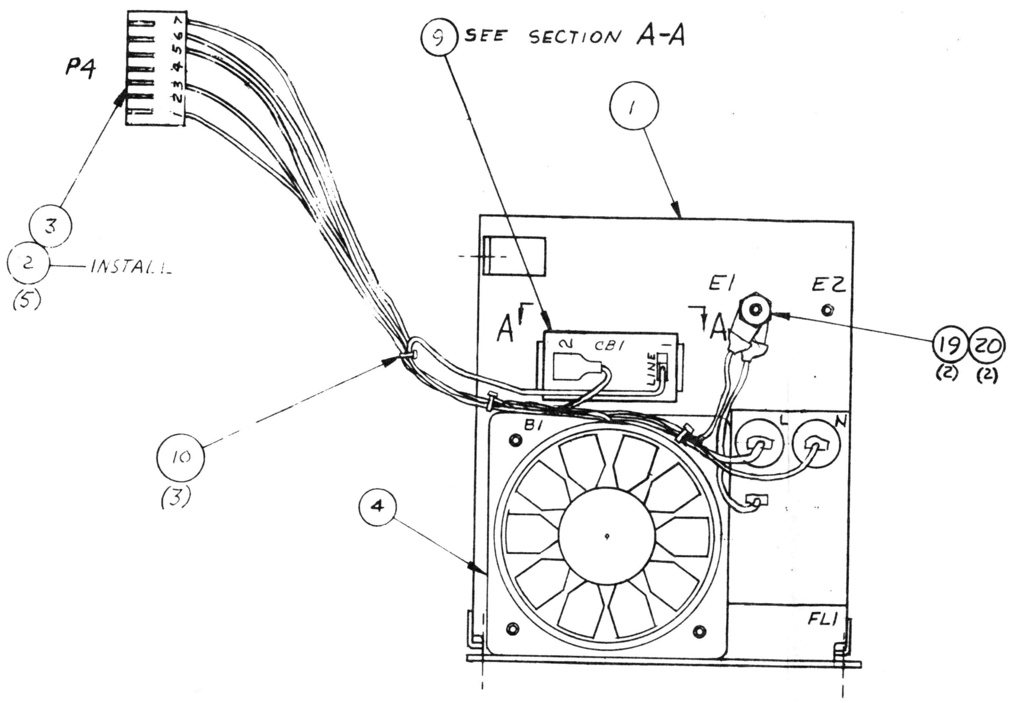
DETAIL H

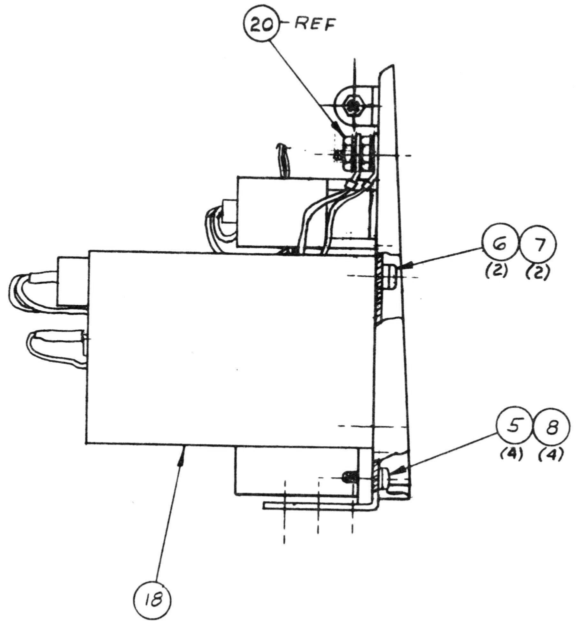
Figure 6-10. Power Supply ssembly (A8) Parts Location and Schematic Diagrams (Sheet 6 of 7,.

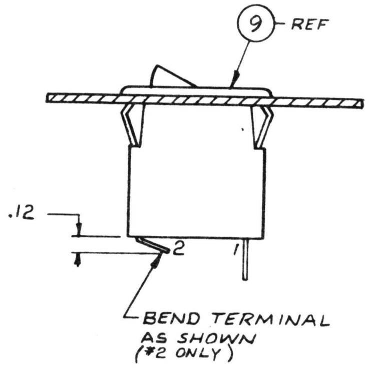

SHT.1) → J1-10
SHT.1) → J1-9
(J5 14506 SHT.1) → J1-11
(J5-8 14506 SHT.1) → J1-8
(J5-12 14506 SHT.1) → J1-12
8
5
3
7
6
Z4
CR3
1N4148
R8
22K
C3
1uF
50V
C4
1uF
50V
R13
3.9 K
R5
4.7K
R4
2.2K
R14
47K
3
1
2
14
13
Z2
LM339
1
2
13
14
3
Z1
LM339
12
7
6
5
4
9
8
11
10
7
6
5
4
11
10
9
8
12
R3
2.2K
CR2
1N5234B
R2
2.49K
1/8W
1%
R1
1/8W
1%
R12
2.49K
1/8W
1%
5
7
1
VCC
Z3
LM358
5
6
4
3
2
R9
220 K
C2
.056uF
50V
R10
1.8K
CR4
1N4148
R11
12.1 K
1/8W
1%
CR1
1N 4148
POWER
J1-3
(14506-SHT.2-J5-3)
J1-13
(SHT.2-J5-13)
J1-14
(SHT. J5-14)
J1-7
(SHT.1 J5-7)
J1-6
(SHT.1 J5-6)
J1-5
(SHT.2-J5-5)
+5
J1-2
(SHT.2-J5-2)
+12
J1-4
+12
-12
J1-1
(14506 SHT.2 J5-1)

NOTES:
1. UNLESS OTHERWISE SPECIFIED ALL RESISTORS ARE 1/4W, [illegible].

Figure 6-10. Power Supply Assembly (A8) Parts Location and Schematic Diagrams (Sheet 7 of 7).

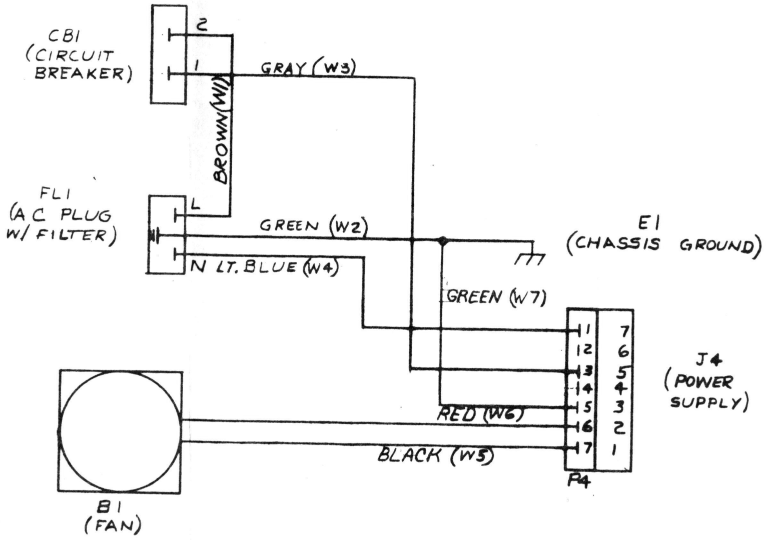

P4
1 2 3 4 5 6 7
9 SEE SECTION A-A
1
3
2 INSTALL
(5)
A
2 CB1
LINE 1
A
E1
E2
19 20
(2) (2)
B1
L
N
10
(3)
4
FL1


20 REF
6 7
(2) (2)
5 8
(4) (4)
18


9 REF
.12
2
1
BEND TERMINAL
AS SHOWN
(#2 ONLY)

SECTION "A - A"

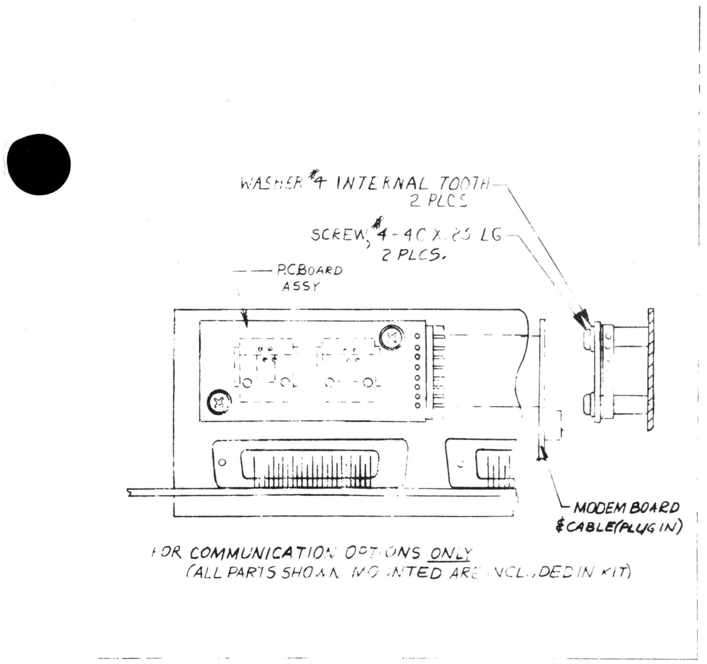
NOTES:
1. WIRE COMPONENTS PER WIRE RUN LIST.
2. LEADS TO BE STRIPPED .25 ±.06 LONG AND TINNED
3. LEADS TO BE STRIPPED .12 $^{+.00}_{-.02}$ LG.
(DO NOT TIN)

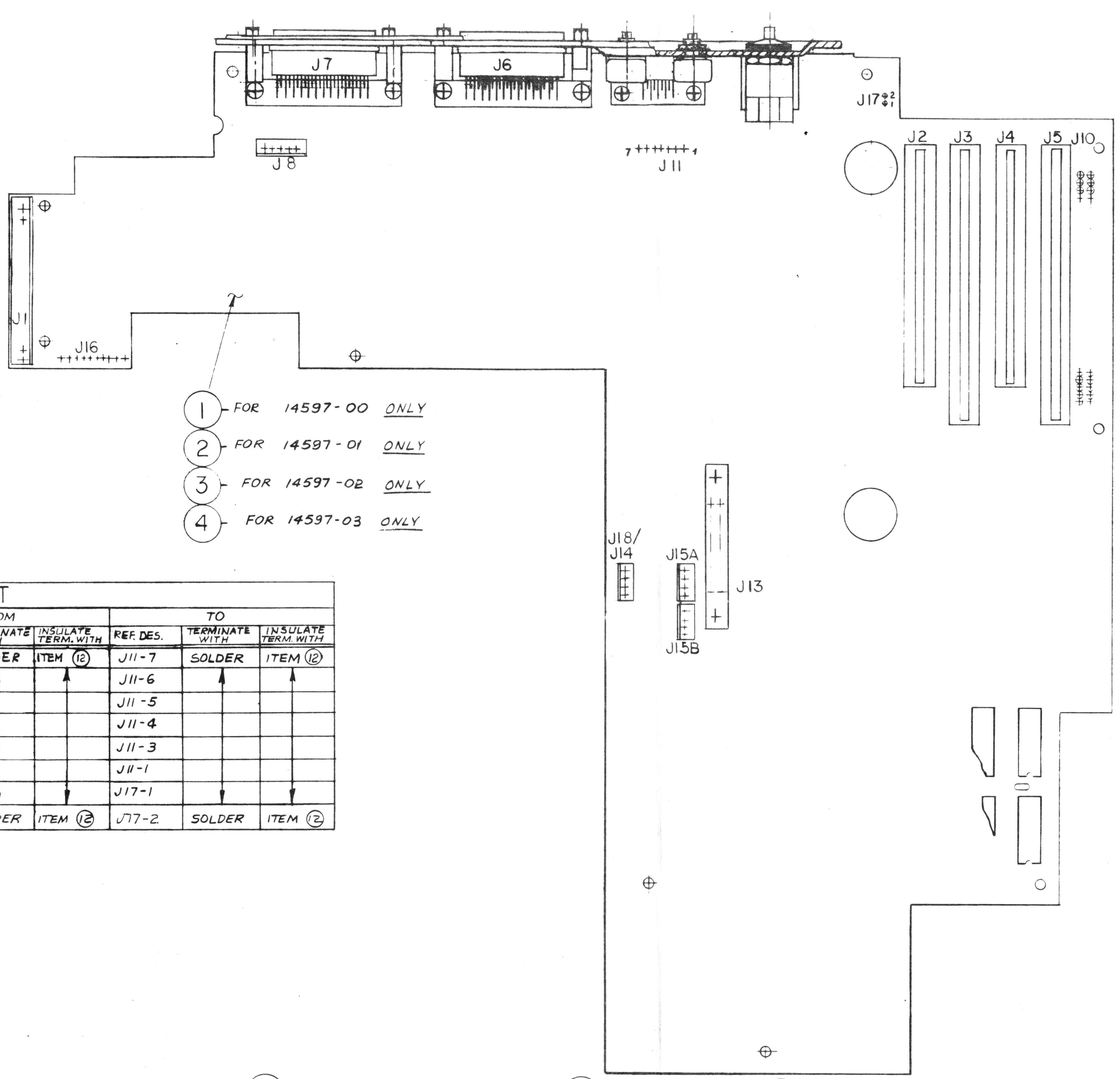

CB1
(CIRCUIT
BREAKER)
2
1
GRAY (W3)
BROWN (W1)
FL1
(AC PLUG
W/ FILTER)
L
GREEN (W2)
N LT. BLUE (W4)
E1
(CHASSIS GROUND)
GREEN (W7)
1
2
3
4
5
6
7
7
6
5
4
3
2
1
J4
(POWER
SUPPLY)
P4
RED (W6)
BLACK (W5)
B1
(FAN)

WIRING DIAGRAM

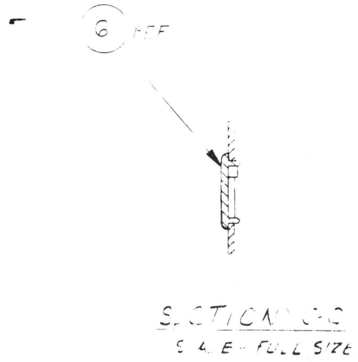
WIRE RUN LIST										
WIRE					FROM			TO		
ITEM NO.	REF DES	AWG	COLOR	LENGTH ±.5"	REF DES	TERM WITH	INSUL. W/SHRINK	REF DES	TERM WITH	INSUL. W/SHRINK
PART OF ITEM ④	—	—	—	7.5"	B1-W5 (BLK WIRE)	—	—	P4-7	ITEM ②, NOTE 3	—
PART OF ITEM ④	—	—	—	↑	B1-W6 (RED WIRE)	—	—	P4-6	ITEM ②, NOTE 3	—
ITEM ⑯	W3	18	GRAY	│	CB1-1	SOLDER, NOTE 2	ITEM ⑫	P4-3	ITEM ② NOTE 3	—
ITEM ⑬	W1	18	BROWN	│	CB1-2	SOLDER, NOTE 2	ITEM ⑫	FL1-L	SOLDER NOTE 2	ITEM ⑪
ITEM ⑭	W2	18	GREEN	│	FL1-GND	SOLDER, NOTE 2	ITEM ⑪	E1	ITEM ⑲ (CRIMP)	—
ITEM ⑰	W4	18	LT BLU	↓	FL1-N	SOLDER, NOTE 2	ITEM ⑪	P4-1	ITEM ②, NOTE 3	—
ITEM ⑮	W7	18	GREEN	7.5"	E1	ITEM ⑲ (CRIMP)	—	P4-5	ITEM ② NOTE 3	—

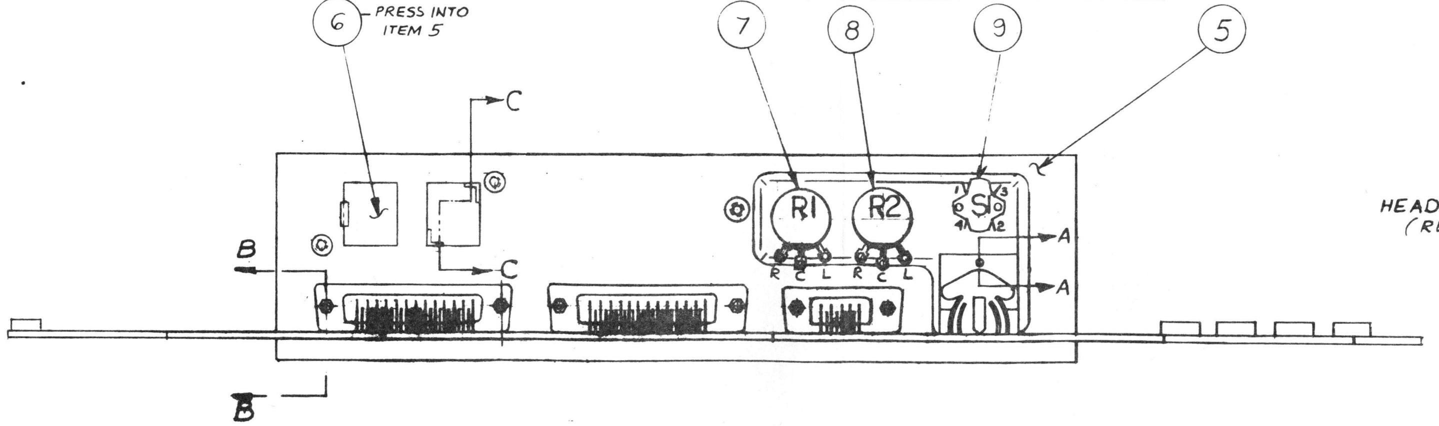
Figure 6-11. Fan/AC Bracket Assembly (A9A1) Parts Location and Schematic Diagrams.


WASHER #4 INTERNAL TOOTH 2 PLCS
SCREW, #4-40 X .25 LG 2 PLCS.
P.C.BOARD ASSY
MODEM BOARD & CABLE(PLUG IN)
FOR COMMUNICATION OPTIONS ONLY
(ALL PARTS SHOWN MOUNTED ARE INCLUDED IN KIT)


J7
J6
J17
J8
J11
J2
J3
J4
J5
J10
J1
J16
① FOR 14597-00 ONLY
② FOR 14597-01 ONLY
③ FOR 14597-02 ONLY
④ FOR 14597-03 ONLY
J18/J14
J15A
J15B
J13

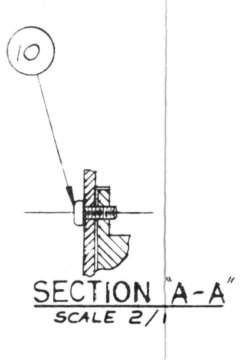
WIRE RUN LIST										
WIRE					FROM			TO		
ITEM No.	COLOR	REF. DES.	A.W.G	LENGTH	REF. DES.	TERMINATE WITH	INSULATE TERM. WITH	REF. DES.	TERMINATE WITH	INSULATE TERM. WITH
⑲	VIO	W1	24	3"	R1 - R	SOLDER	ITEM ⑫	J11-7	SOLDER	ITEM ⑫
⑰	BLU	W2	24		R1 - C			J11-6		
⑯	GRN	W3	24		R1 - L			J11-5		
⑮	YEL	W4	24		R2 - R			J11-4		
⑭	ORG	W5	24		R2 - C			J11-3		
⑱	BRN	W6	24		R2 - L			J11-1		
⑱	BRN	W7	24		S1 - 3			J17-1		
⑬	RED	W8	24	3"	S1 - 4	SOLDER	ITEM ⑫	J17-2	SOLDER	ITEM ⑫


⑥ REF
SECTION C-C
SCALE - FULL SIZE


⑥ PRESS INTO ITEM 5
⑦
⑧
⑨
⑤
C
C
B
B
R1
R2
S1
R C L
R C L
A
A

NOTES:

1. WIRE COMPONENTS PER WIRE RUN LIST & DRESS WIRES USING TIE WRAP ITEM ⑳ AS REQ'D (TRIM AS REQ'D)


⑩
SECTION "A-A"
SCALE 2/1

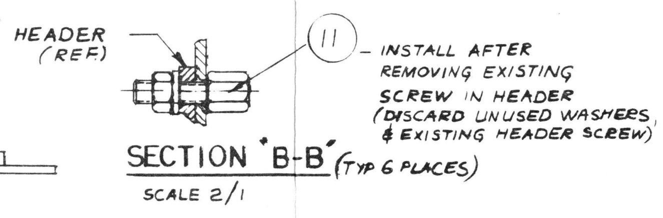

HEADER (REF)
⑪ - INSTALL AFTER REMOVING EXISTING SCREW IN HEADER (DISCARD UNUSED WASHERS & EXISTING HEADER SCREW)
SECTION "B-B" (TYP 6 PLACES)
SCALE 2/1

Figure 6-12. I/O Mother Board Assembly and Rear Panel Assembly (A9A2) Parts Location and Schematic Diagrams (Sheet 1 of 14).

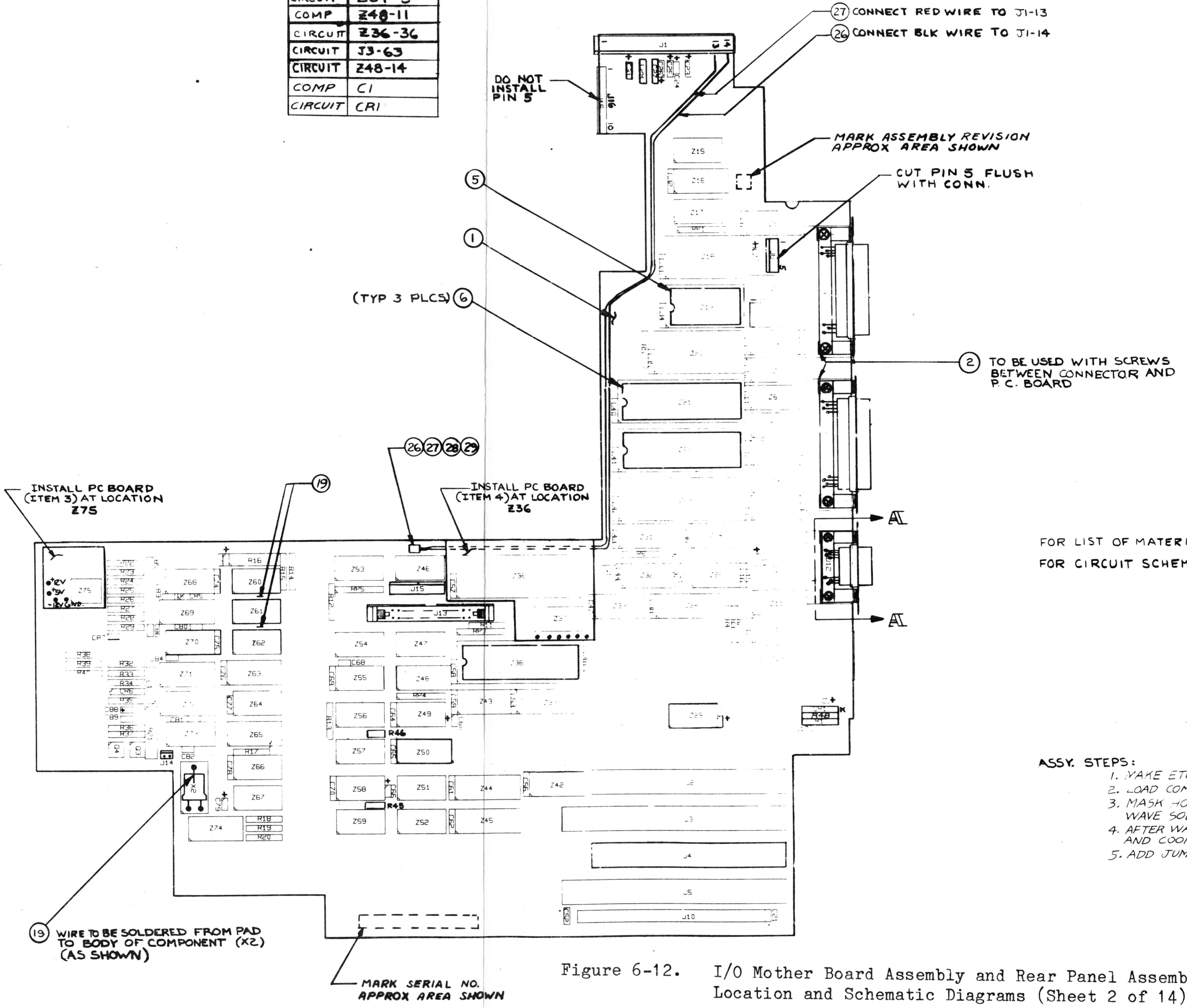
JUMPER CHART (SEE NOTE 4)

FROM	TO	TO	ADDING	WIRE ITEM #
Z54-1	FEEDTHRU		———	13
Z12-12	Z22-22		———	14
Z54-3	Z33-5		———	15
Z36-33	Z33-6		———	16
* J15-6	J15-7	J15-3	———	7 *
Z37-7	Z37-13		———	11
Z15-1	Z21-1		———	17
C28 + PAD	FEEDTHRU		———	9
C30 PAD (NEAR CONN)	C8 + PAD		———	10
* J15-1	J15-8		———	8 *
Z15-3	Z18-9		———	18
Z58-1	R45		R45	20
Z52-14	R45		R45	20
Z57-13	R46		R46	20
Z50-16	R46		R46	20
+12 PAD	+12V (C19 PAD)		14651	14
+5 PAD	Z69-16		14651	12
-12 PAD	-12V		14651	16
GND PAD	Z68-7		14651	18
C71 PAD	C71 PAD		———	19,20
C72 PAD	C72 PAD		———	19,20
14676	Z48-11		14676	16
14676	Z29-8		14676	12
14676	Z11-4		14676	11
14676	Z36-29		14676	15
14676	Z36-28		14676	17
14676	Z47-13		14676	13
Z28-20	Z28-27	Z28-29		11
CR1	R1		———	11
C1	CR1		———	11

*ON CIRCUIT SIDE AFTER TEST

ETCH CUT CHART

SIDE	LOCATION
CIRCUIT	Z19-9
CIRCUIT	Z48-13
COMP	Z18-18
CIRCUIT	Z37-13
COMP	Z54-1
CIRCUIT	Z54-3
COMP	Z48-11
CIRCUIT	Z36-36
CIRCUIT	J3-63
CIRCUIT	Z48-14
COMP	C1
CIRCUIT	CR1



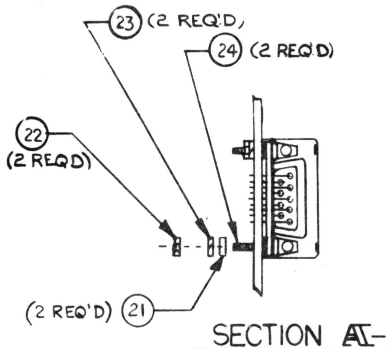
(27) CONNECT RED WIRE TO J1-13
(26) CONNECT BLK WIRE TO J1-14
DO NOT INSTALL PIN 5
MARK ASSEMBLY REVISION APPROX AREA SHOWN
CUT PIN 5 FLUSH WITH CONN.
5
1
(TYP 3 PLCS) 6
2 TO BE USED WITH SCREWS BETWEEN CONNECTOR AND P.C. BOARD
A
A
26 27 28 29
19
INSTALL PC BOARD (ITEM 3) AT LOCATION Z75
INSTALL PC BOARD (ITEM 4) AT LOCATION Z36
19 WIRE TO BE SOLDERED FROM PAD TO BODY OF COMPONENT (X2) (AS SHOWN)
MARK SERIAL NO. APPROX AREA SHOWN
J1
J16
J15
J13
J3
J4
J5
J10
Z15
Z16
Z53
Z48
Z66
Z60
Z61
Z62
Z69
Z70
Z75
Z54
Z47
Z55
Z46
Z56
Z49
Z57
Z50
Z58
Z51
Z59
Z52
Z44
Z45
Z42
Z36
Z63
Z64
Z65
Z66
Z67
Z74
R16
R17
R18
R19
R20
R46
R48
X2
J14

FOR LIST OF MATERIALS SEE A0002-14503-00

FOR CIRCUIT SCHEMATIC SEE D0003-14503

ASSY. STEPS:

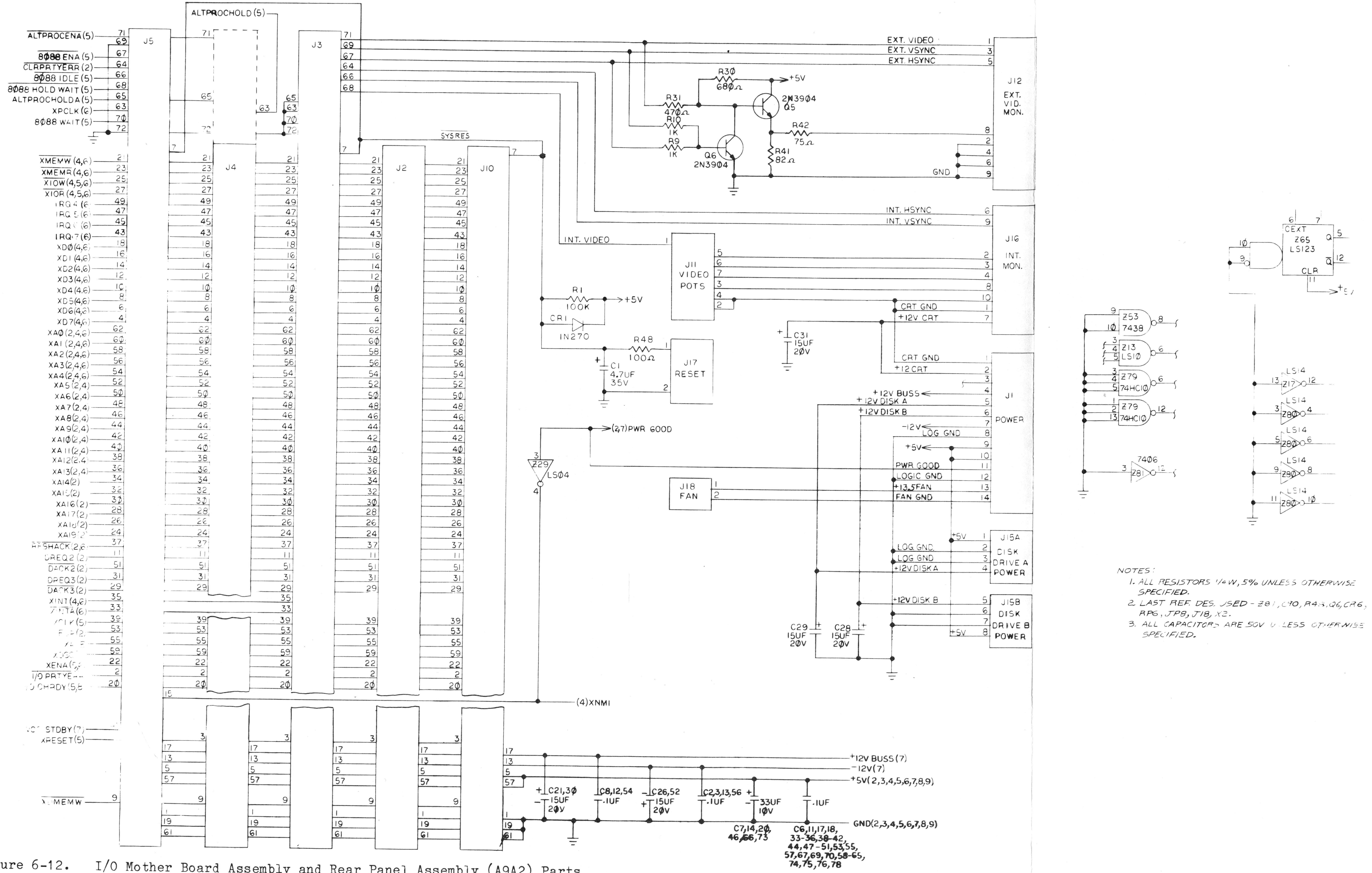
1. MAKE ETCH CUTS AS SHOWN IN CHART.
2. LOAD COMPONENTS.
3. MASK HOLES FOR Z36 AND Z75 BEFORE WAVE SOLDERING.
4. AFTER WAVE SOLDERING. INSTALL C0010-14651 AND C0010-14676.
5. ADD JUMPERS AS SHOWN BY CHART.



23 (2 REQ'D)
24 (2 REQ'D)
22 (2 REQ'D)
(2 REQ'D) 21

SECTION A-A

Figure 6-12. I/O Mother Board Assembly and Rear Panel Assembly (A9A2) Parts Location and Schematic Diagrams (Sheet 2 of 14).


ALTPROCHOLD(5)
ALTPROCENA(5)
8088 ENA(5)
CLRPRTYERR(2)
8088 IDLE(5)
8088 HOLD WAIT(5)
ALTPROCHOLDA(5)
XPCLK(6)
8088 WAIT(5)
XMEMW(4,6)
XMEMR(4,6)
XIOW(4,5,6)
XIOR(4,5,6)
XD0(4,6)
XD1(4,6)
XD2(4,6)
XD3(4,6)
XD4(4,6)
XD5(4,6)
XD6(4,6)
XD7(4,6)
XA0(2,4,6)
XA1(2,4,6)
XA2(2,4,6)
XA3(2,4,6)
XA4(2,4,6)
XA5(2,4)
XA6(2,4)
XA7(2,4)
XA8(2,4)
XA9(2,4)
XA10(2,4)
XA11(2,4)
XA12(2,4)
XA13(2,4)
XA14(2)
XA15(2)
XA16(2)
XA17(2)
XA18(2)
XA19(2)
XENA(5)
STDBY(7)
XRESET(5)
J5
J4
J3
J2
J10
SYSRES
EXT. VIDEO
EXT. VSYNC
EXT. HSYNC
J12
EXT. VID. MON.
R30 680Ω
+5V
R31 470Ω
R10 1K
R9 1K
2N3904 Q5
Q6 2N3904
R42 75Ω
R41 82Ω
GND
INT. HSYNC
INT. VSYNC
J16
INT. MON.
INT. VIDEO
J11 VIDEO POTS
CRT GND
+12V CRT
R1 100K
CR1 1N270
R48 100Ω
C1 4.7UF 35V
J17 RESET
C31 15UF 20V
J1 POWER
+12V BUSS
+12V DISK A
+12V DISK B
-12V
LOG GND
PWR GOOD
LOGIC GND
+13.5FAN
FAN GND
(27)PWR GOOD
Z29 LS04
J18 FAN
J15A DISK DRIVE A POWER
J15B DISK DRIVE B POWER
C29 15UF 20V
C28 15UF 20V
(4)XNMI
+12V BUSS(7)
-12V(7)
+5V(2,3,4,5,6,7,8,9)
GND(2,3,4,5,6,7,8,9)
C21,30 15UF 20V
C8,12,54 .1UF
C26,52 15UF 20V
C2,3,13,56 .1UF
33UF 10V
.1UF
C7,14,20,46,66,73
C6,11,17,18,33-36,38-42,44,47-51,53,55,57,67,69,70,58-65,74,75,76,78
CEXT
Z65 LS123
CLR
Z53 7438
Z13 LS10
Z79 74HC10
7406 Z81
LS14 Z17
LS14 Z80

NOTES:

1. ALL RESISTORS 1/4W, 5% UNLESS OTHERWISE SPECIFIED.
2. LAST REF. DES. USED - Z81, C40, R48, Q6, CR6, RP6, JP8, J18, X2.
3. ALL CAPACITORS ARE 50V UNLESS OTHERWISE SPECIFIED.

Figure 6-12. I/O Mother Board Assembly and Rear Panel Assembly (A9A2) Parts Location and Schematic Diagrams (Sheet 3 of 14).

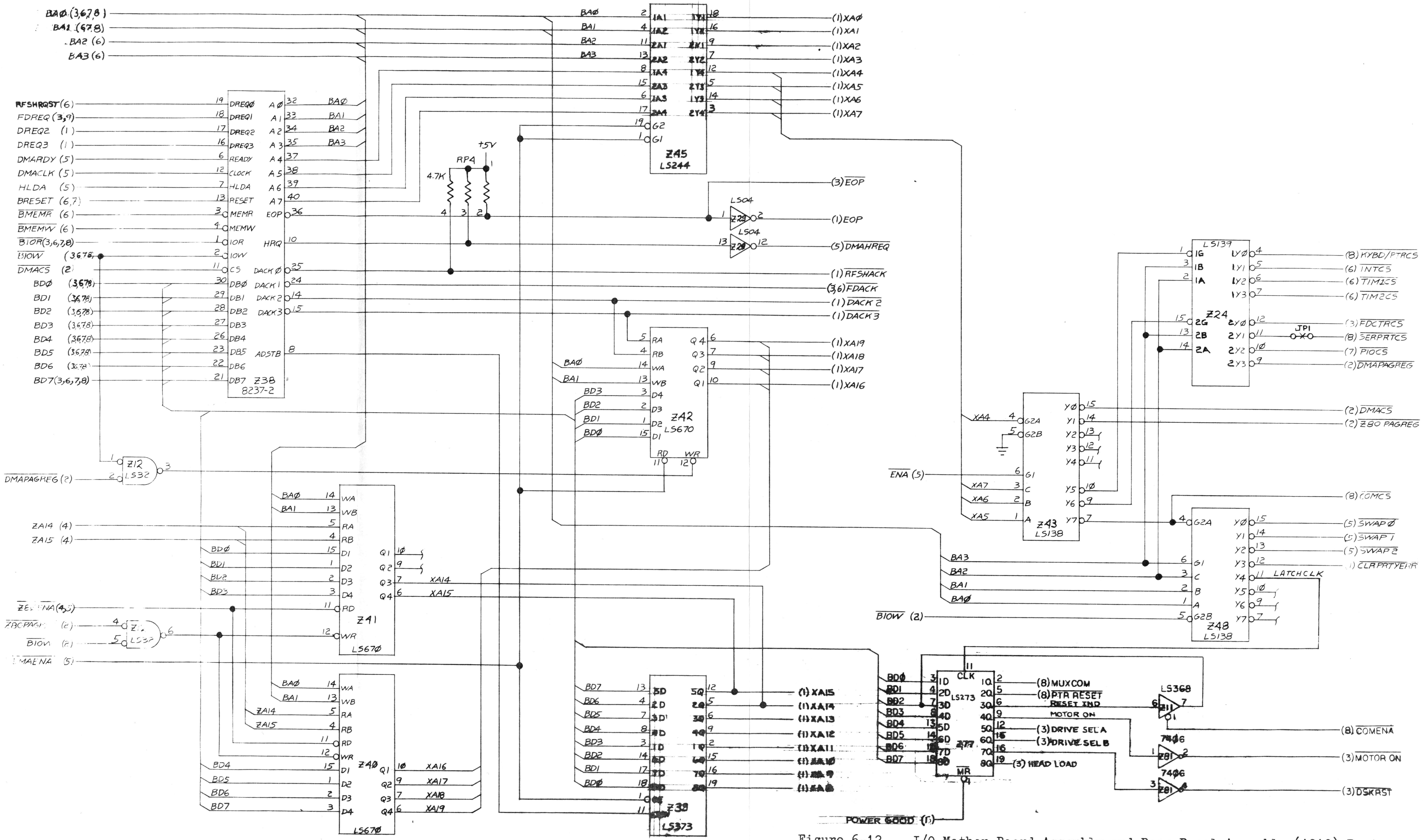

BA0 (3,6,7,8)
BA1 (6,7,8)
BA2 (6)
BA3 (6)
RFSHRQST (6)
FDREQ (3,9)
DREQ2 (1)
DREQ3 (1)
DMARDY (5)
DMACLK (5)
HLDA (5)
BRESET (6,7)
BMEMR (6)
BMEMW (6)
BIOR (3,6,7,8)
BIOW (3,6,7,8)
DMACS (2)
BD0 (3,6,7,8)
BD1 (3,6,7,8)
BD2 (3,6,7,8)
BD3 (3,6,7,8)
BD4 (3,6,7,8)
BD5 (3,6,7,8)
BD6 (3,6,7,8)
BD7 (3,6,7,8)
DREQ0
DREQ1
DREQ2
DREQ3
READY
CLOCK
HLDA
RESET
MEMR
MEMW
IOR
IOW
CS
DB0
DB1
DB2
DB3
DB4
DB5
DB6
DB7
A0
A1
A2
A3
A4
A5
A6
A7
EOP
HRQ
DACK 0
DACK 1
DACK 2
DACK 3
ADSTB
Z38
8237-2
+5V
RP4
4.7K
Z45
LS244
G1
G2
(1) XA0
(1) XA1
(1) XA2
(1) XA3
(1) XA4
(1) XA5
(1) XA6
(1) XA7
(3) EOP
LS04
Z23
(1) EOP
(5) DMAHREQ
(1) RFSHACK
(3,6) FDACK
(1) DACK 2
(1) DACK 3
RA
RB
WA
WB
D1
D2
D3
D4
Q1
Q2
Q3
Q4
RD
WR
Z42
LS670
(1) XA19
(1) XA18
(1) XA17
(1) XA16
Z12
LS32
DMAPAGREG (2)
ZA14 (4)
ZA15 (4)
Z41
LS670
XA14
XA15
ZENA (4,5)
Z80PAGE (2)
BIOW (2)
DMAENA (5)
Z40
LS670
XA16
XA17
XA18
XA19
Z39
LS373
(1) XA15
(1) XA14
(1) XA13
(1) XA12
(1) XA11
(1) XA10
(1) XA9
(1) XA8
LS139
Z24
1G
1B
1A
2G
2B
2A
1Y0
1Y1
1Y2
1Y3
2Y0
2Y1
2Y2
2Y3
(8) KYBD/PTRCS
(6) INTCS
(6) TIM1CS
(6) TIM2CS
(3) FDCTRCS
JP1
(8) SERPRTCS
(7) PIOCS
(2) DMAPAGREG
Z43
LS138
G2A
G2B
G1
C
B
A
Y0
Y1
Y2
Y3
Y4
Y5
Y6
Y7
ENA (5)
(2) DMACS
(2) Z80 PAGREG
(8) COMCS
(5) SWAP 0
(5) SWAP 1
(5) SWAP 2
(1) CLRPRTYERR
LATCHCLK
Z48
LS138
BIOW (2)
LS273
Z27
CLK
MR
(8) MUXCOM
(8) PTR RESET
RESET IND
MOTOR ON
(3) DRIVE SEL A
(3) DRIVE SEL B
(3) HEAD LOAD
LS368
Z11
7406
Z81
(8) COMENA
(3) MOTOR ON
(3) DSKRST
POWER GOOD (1)

Figure 6-12. I/O Mother Board Assembly and Rear Panel Assembly (A9A2) Parts Location and Schematic Diagrams (Sheet 4 of 14).

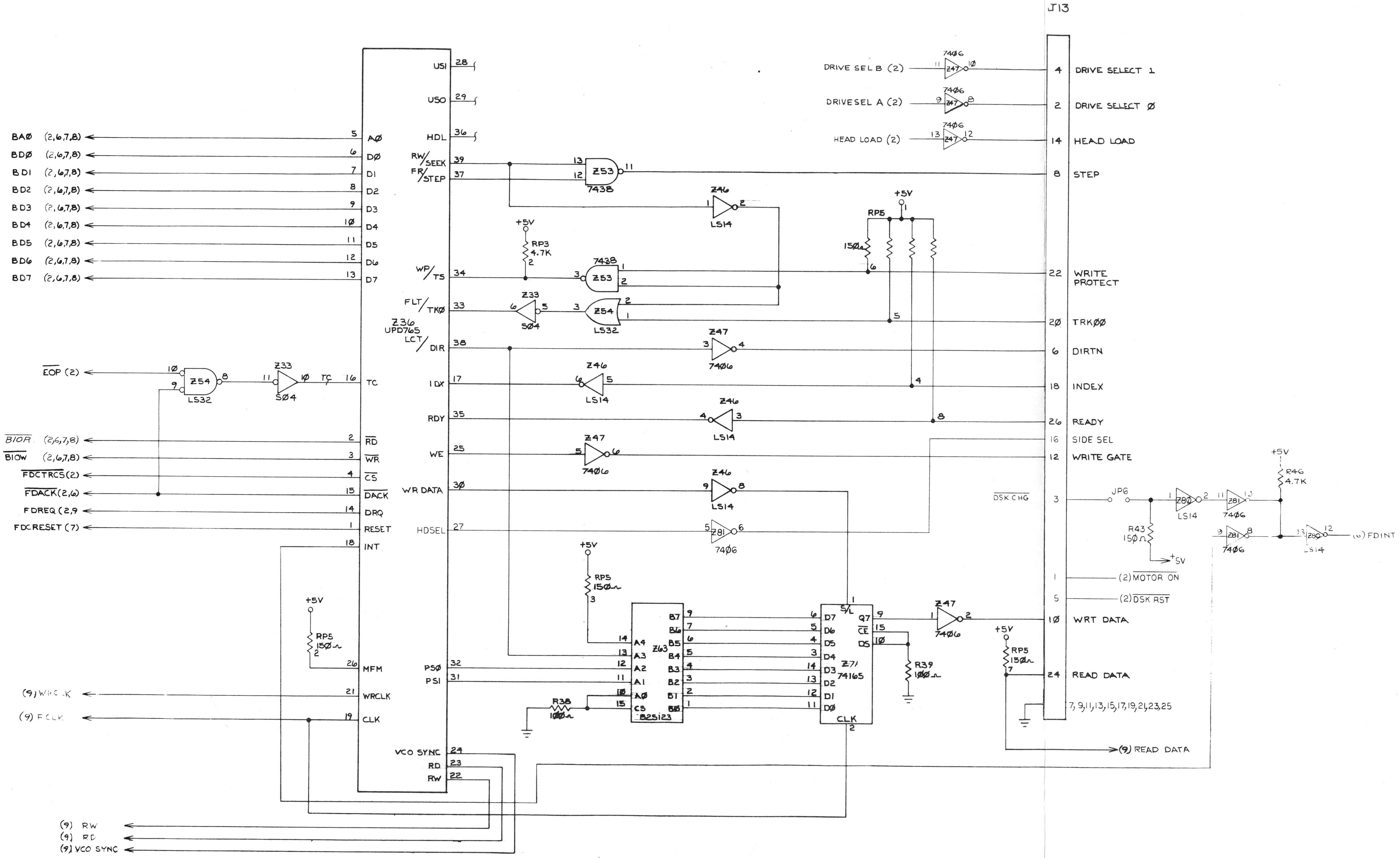

J13
Z36 UPD765
US1
US0
HDL
RW/SEEK
FR/STEP
WP/TS
FLT/TK0
LCT/DIR
IDX
RDY
WE
WR DATA
HDSEL
A0
D0
D1
D2
D3
D4
D5
D6
D7
TC
RD
WR
CS
DACK
DRQ
RESET
INT
MFM
WRCLK
CLK
PS0
PS1
VCO SYNC
RD
RW
BA0 (2,6,7,8)
BD0 (2,6,7,8)
BD1 (2,6,7,8)
BD2 (2,6,7,8)
BD3 (2,6,7,8)
BD4 (2,6,7,8)
BD5 (2,6,7,8)
BD6 (2,6,7,8)
BD7 (2,6,7,8)
EOP (2)
BIOR (2,6,7,8)
BIOW (2,6,7,8)
FDCTRCS (2)
FDACK (2,6)
FDREQ (2,9
FDCRESET (7)
(9) WRCLK
(9) FCLK
(9) RW
(9) RD
(9) VCO SYNC
Z53 7438
Z46 LS14
Z33 S04
Z54 LS32
Z47 7406
Z81 7406
Z80 LS14
Z63 825123
Z71 74165
+5V
RP3 4.7K
RP5 150Ω
R38 100Ω
R39 100Ω
R43 150Ω
R46 4.7K
JP6
DRIVE SEL B (2)
DRIVESEL A (2)
HEAD LOAD (2)
DRIVE SELECT 1
DRIVE SELECT 0
HEAD LOAD
STEP
WRITE PROTECT
TRK00
DIRTN
INDEX
READY
SIDE SEL
WRITE GATE
DSK CHG
(2) MOTOR ON
(2) DSK RST
WRT DATA
READ DATA
7,9,11,13,15,17,19,21,23,25
(9) READ DATA
(6) FDINT
A4
A3
A2
A1
A0
CS
B7
B6
B5
B4
B3
B2
B1
B0
S/L
Q7
CE
DS
CLK

Figure 6-12. I/O Mother Board Assembly and Rear Panel Assembly (A9A2) Parts Location and Schematic Diagrams (Sheet 5 of 14).

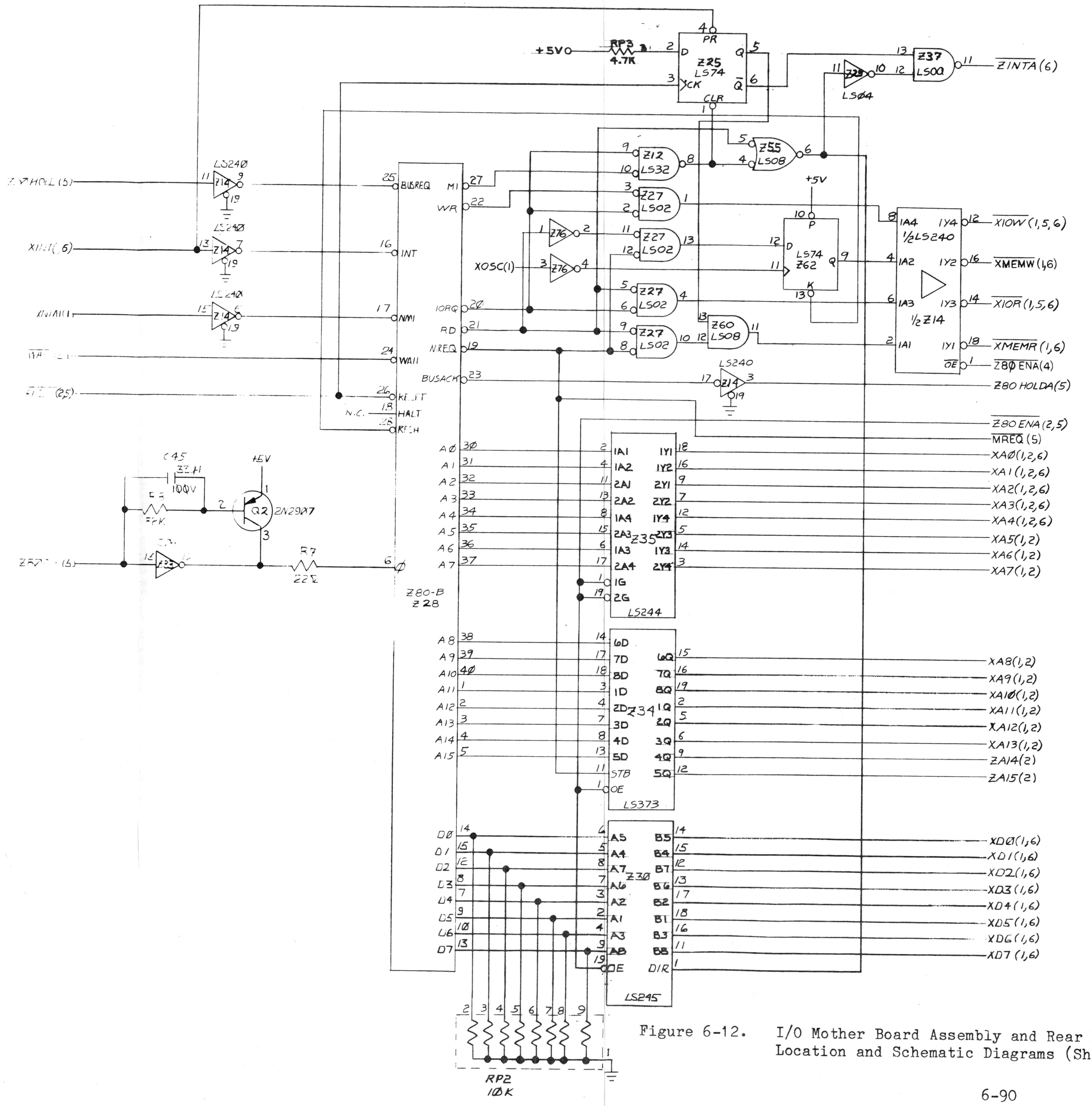
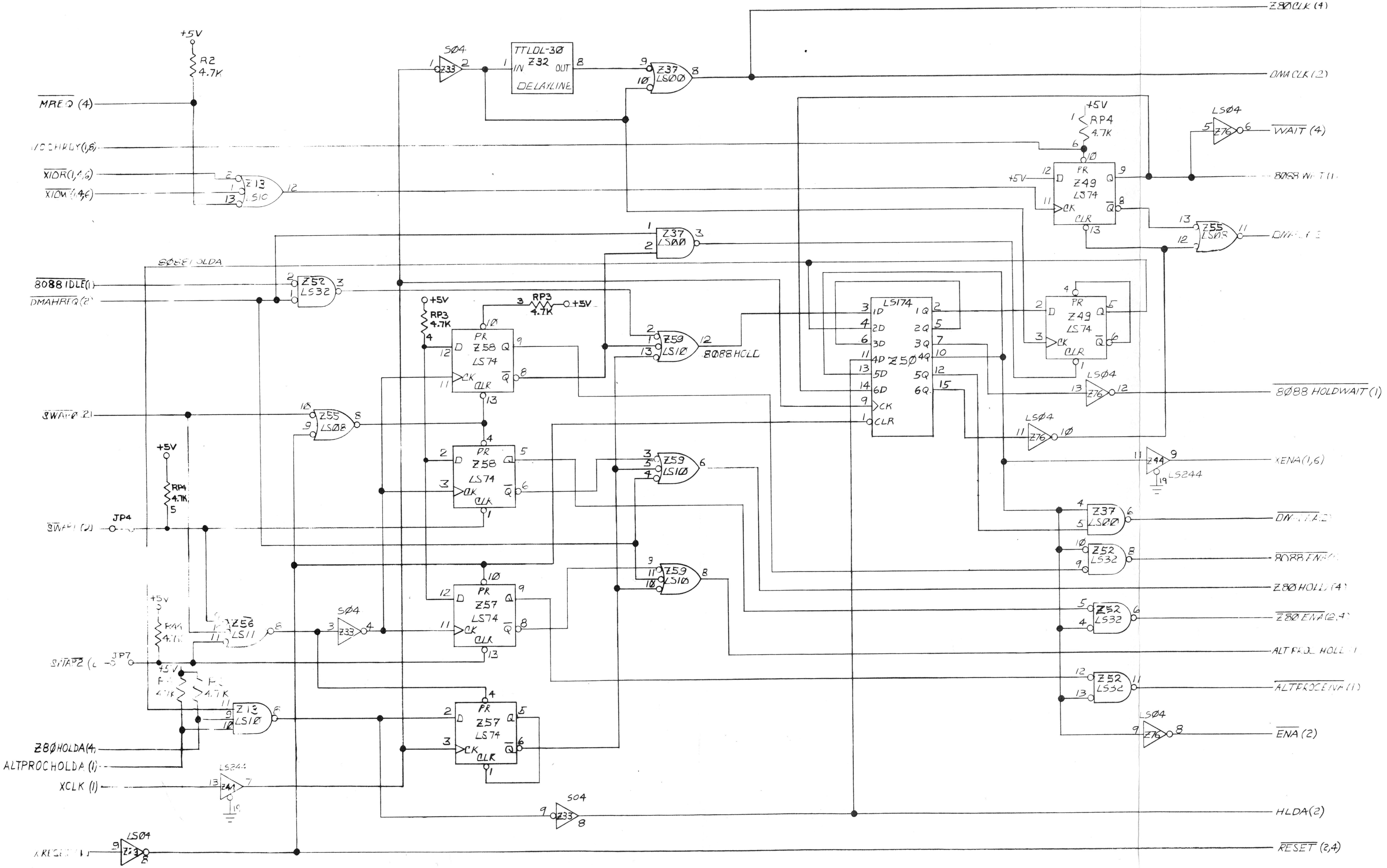

+5V
RP3
4.7K
Z25
LS74
PR
CLR
D
CK
Q
Z37
LS00
ZINTA(6)
LS04
Z12
LS32
Z55
LS08
Z27
LS02
Z76
XOSC(1)
LS74
Z62
Z60
LS08
1/2LS240
1/2Z14
XIOW(1,5,6)
XMEMW(1,6)
XIOR(1,5,6)
XMEMR(1,6)
Z80 ENA(4)
LS240
Z14
Z80 HOLDA(5)
Z80 ENA(2,5)
MREQ(5)
LS240
XINT(6)
XNMI
BUSREQ
INT
NMI
WAIT
HALT
N.C.
M1
WR
IORQ
RD
MREQ
BUSACK
C45
33H
100V
+5V
Q2
2N2907
R7
22Ω
Z80-B
Z28
A0
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
A11
A12
A13
A14
A15
Z35
LS244
XA0(1,2,6)
XA1(1,2,6)
XA2(1,2,6)
XA3(1,2,6)
XA4(1,2,6)
XA5(1,2)
XA6(1,2)
XA7(1,2)
Z34
LS373
STB
OE
XA8(1,2)
XA9(1,2)
XA10(1,2)
XA11(1,2)
XA12(1,2)
XA13(1,2)
ZA14(2)
ZA15(2)
D0
D1
D2
D3
D4
D5
D6
D7
Z30
LS245
DIR
XD0(1,6)
XD1(1,6)
XD2(1,6)
XD3(1,6)
XD4(1,6)
XD5(1,6)
XD6(1,6)
XD7(1,6)
RP2
10K

Figure 6-12. I/O Mother Board Assembly and Rear Panel Assembly (A9A2) Parts Location and Schematic Diagrams (Sheet 6 of 14).



+5V
R2
4.7K
MREQ (4)
XIOR(1,4,6)
XIOW(1,4,6)
Z13
LS10
8088 IDLE(1)
DMAHREQ(2)
SWAP0 (2)
+5V
RP4
4.7K
JP4
SWAP1 (2)
JP7
SWAP2
Z80HOLDA(4)
ALTPROCHOLDA (1)
XCLK (1)
LS244
Z41
LS04
S04
Z33
TTLDL-30
Z32
IN
OUT
DELAYLINE
Z37
LS00
Z52
LS32
Z55
LS08
RP3
4.7K
Z58
LS74
PR
CLR
CK
D
Q
Z57
LS74
Z56
LS11
Z59
LS10
8088HOLD
LS174
Z50
CK
CLR
RP4
4.7K
Z49
LS74
LS04
Z76
Z44
LS244
Z80CLK (4)
DMA CLK (2)
WAIT (4)
8088 WAIT (1)
8088 HOLDWAIT (1)
XENA(1,6)
Z80 HOLD (4)
Z80 ENA (2,4)
ALTPROCENA (1)
ENA (2)
HLDA(2)
RESET (2,4)

Figure 6-12. I/O Mother Board Assembly and Rear Panel Assembly (A9A2) Parts Location and Schematic Diagrams (Sheet 7 of 14).

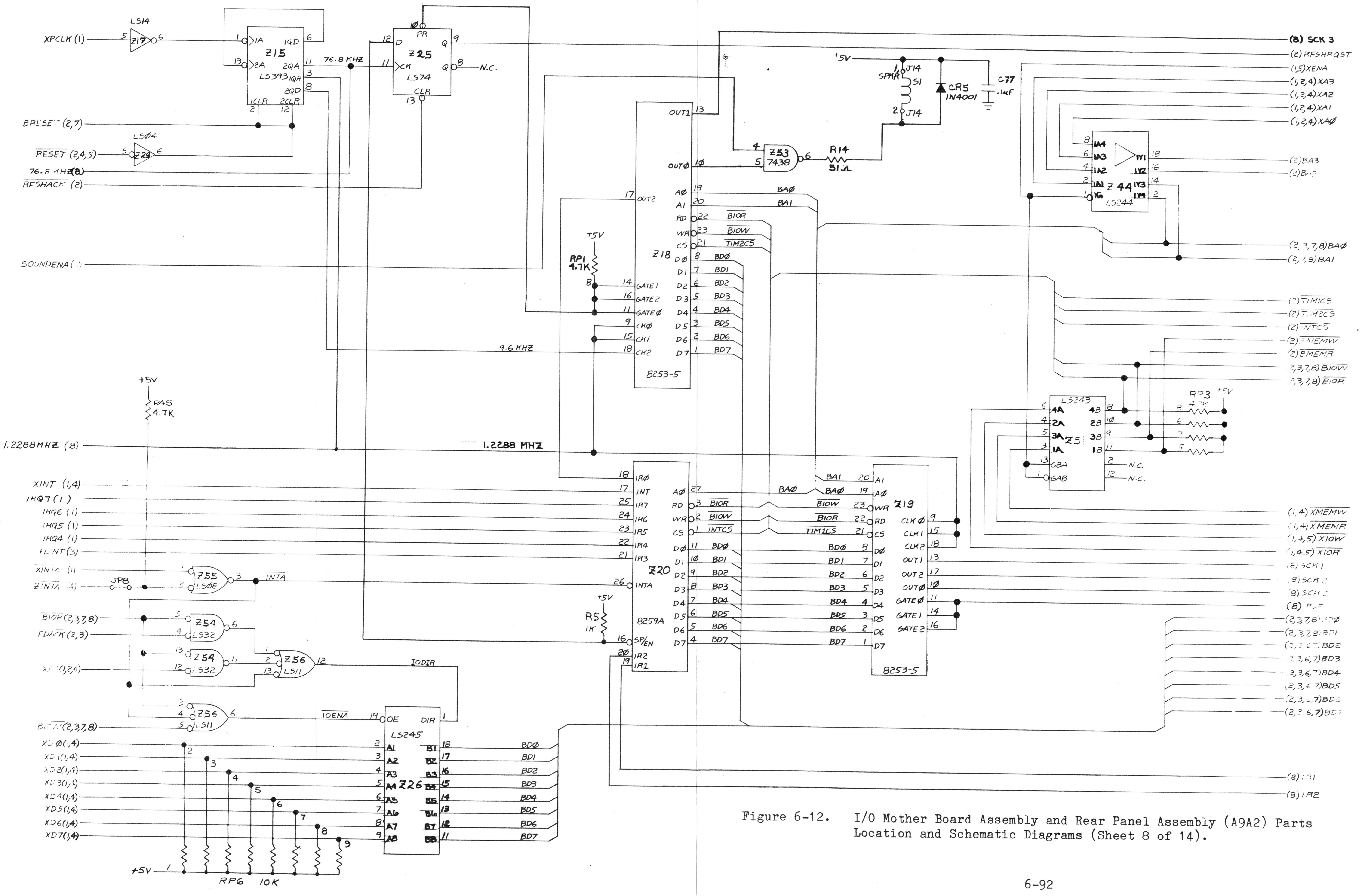
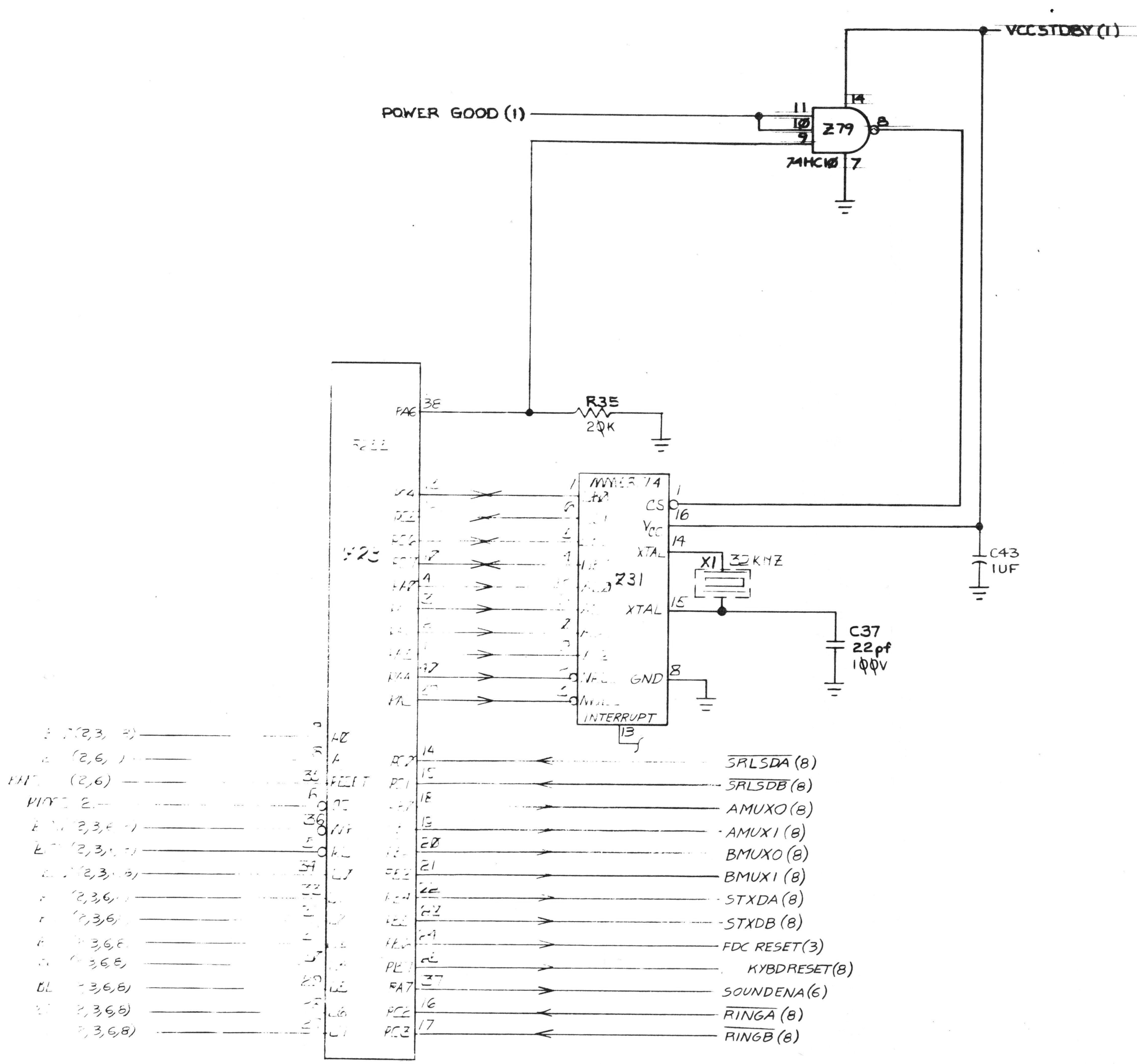

XPCLK (1)
LS14
Z17
Z15
LS393
76.8 KHZ
Z25
LS74
PR
CLR
N.C.
BRESET (2,7)
LS04
Z23
RESET (2,4,5)
76.8 KHZ (8)
RFSHACK (2)
SOUNDENA
+5V
RP1
4.7K
Z18
8253-5
OUT1
OUT0
OUT2
GATE 1
GATE 2
GATE 0
CK0
CK1
CK2
9.6 KHZ
BA0
BA1
BIOR
BIOW
TIM2CS
BD0
BD1
BD2
BD3
BD4
BD5
BD6
BD7
SPKR
J14
S1
CR5
1N4001
C77
.1uF
Z53
7438
R14
51Ω
(8) SCK 3
(2) RFSHRQST
(1,5) XENA
(1,2,4) XA3
(1,2,4) XA2
(1,2,4) XA1
(1,2,4) XA0
Z44
LS244
(2) BA3
(2) BA2
(2,3,7,8) BA0
(2,3,7,8) BA1
(2) TIM1CS
(2) TIM2CS
(2) INTCS
(2) EMEMW
(2) EMEMR
(2,3,7,8) BIOW
(2,3,7,8) BIOR
LS243
Z51
RP3
4.7K
N.C.
R45
4.7K
1.2288 MHZ (8)
1.2288 MHZ
XINT (1,4)
IRQ7 (1)
IRQ6 (1)
IRQ5 (1)
IRQ4 (1)
FDINT (3)
XINTA (1)
ZINTA (4)
JP8
Z55
LS08
INTA
BIOR (2,3,7,8)
FDACK (2,3)
Z54
LS32
Z56
LS11
IODIR
IOENA
BIOW (2,3,7,8)
Z20
8259A
R5
1K
SP/EN
Z19
8253-5
CLK 0
CLK 1
CLK 2
GATE 0
GATE 1
GATE 2
(1,4) XMEMW
(1,4) XMEMR
(1,4,5) XIOW
(1,4,5) XIOR
(8) SCK 1
(8) SCK 2
(8) SCK 3
(8) PLF
(2,3,7,8) BD0
(2,3,7,8) BD1
(2,3,6,7) BD2
(2,3,6,7) BD3
(2,3,6,7) BD4
(2,3,6,7) BD5
(2,3,6,7) BD6
(2,3,6,7) BD7
(8) IR1
(8) IR2
XD0 (1,4)
XD1 (1,4)
XD2 (1,4)
XD3 (1,4)
XD4 (1,4)
XD5 (1,4)
XD6 (1,4)
XD7 (1,4)
Z26
LS245
OE
DIR
+5V
RP6
10K

Figure 6-12. I/O Mother Board Assembly and Rear Panel Assembly (A9A2) Parts Location and Schematic Diagrams (Sheet 8 of 14).


POWER GOOD (1)
VCCSTDBY (1)
Z79
74HC10
R35
20K
C43
1UF
X1
32KHZ
C37
22pf
100V
Z31
CS
VCC
XTAL
XTAL
GND
INTERRUPT
Z23
SRLSDA (8)
SRLSDB (8)
AMUX0 (8)
AMUX1 (8)
BMUX0 (8)
BMUX1 (8)
STXDA (8)
STXDB (8)
FDC RESET(3)
KYBDRESET(8)
SOUNDENA(6)
RINGA (8)
RINGB (8)

POWER AND GROUND LOCATOR CHART

PAGE(S)	REF DES	DEVICE TYPE	GND	+5V	+12V	-12V
9	Z66	74S74	7	14	–	–
5,6	Z56	74LS11	7	14	–	–
5	Z32	TTLDL-30	7	14	–	–
5	Z13,59	74LS10	7	14	–	–
3,4,5,9	Z37,61	74LS00	7	14	–	–
5	Z50	74LS175	8	16	–	–
3	Z73	74LS624	7		–	–
2,3,4, 5,6,8	Z12,Z52 Z54,	74LS32	7	14	–	–
7	Z23	8255	7	26	–	–
5,6,4,9	Z25,Z49, Z57,Z58, Z62,Z64	74LS74	7	14	–	–
6	Z18,Z19	8253-5	12	24	–	–
9,6,8,3	Z17,Z46, Z80	74LS14	7	14	–	–
4	Z14	74LS240	10	20	–	–
3,6	Z53	7438	7	14	–	–
3	Z65	74LS123	8	16	–	–
6	Z20	8259A	14	28	–	–
7	Z79	74HC10	7	–	–	–
8	Z21,Z22	7201	20	40	–	–
8	Z3,Z4, Z8,Z10	1488	7	–	14	1
8	Z2,Z5, Z6,Z7, Z9	1489	7	14	–	–
9	Z69,Z72	74LS221	8	16	–	–
2,4,5, 6,8	Z35,Z44, Z45	74LS244	10	20	–	–
6	Z51	74LS243	7	14	–	–
3,8	Z1,Z16,	74LS153	8	16	–	–
4 6	Z26,Z30	74LS245	10	20	–	–
2	Z24	74LS139	8	16	–	–
2,7	Z43,Z48	74LS138	8	16	–	–
7,8	Z11	74S368	8	16	–	–
2	Z40,Z41, Z42	74LS670	8	16	–	–
2,4	Z34,Z39	74LS373	10	20	–	–
1,2,4, 5,6	Z29 Z76	74LS04	7	14	–	–
2	Z38	8237-2	20	31	–	–
3,4,5	Z33	74S04	7	14	–	–
9	Z74	74LS629	9	16	–	–
3,9	Z47 Z81	7406	7	14	–	–
9	Z75	[illegible]	5	12	13	4

PAGE(S)	REF.DES.	DEVICE TYPE	GND	+5V	+12V	-12V
9,6	Z15 Z67,Z70	74LS393	7	14	–	–
4	Z27	74LS02	7	14	–	–
3	Z36	µPD 765	20	40	–	–
4	Z28	Z80B	29	11	–	–
7	Z31	MM 58174	8	–	–	–
3	Z63	82S123	8	16	–	–
3	Z71	74165	8	16	–	–
3,4,5,6	Z55,Z60	74LS08	7	14	–	–
9	Z68	MC4044	7	14	–	–
2	Z77	74LS273	10	20	–	–
8	Z78	74LS157	8	16	–	–

Figure 6-12. I/O Mother Board Assembly and Rear Panel Assembly (A9A2) Parts Location and Schematic Diagrams (Sheet 9 of 14).

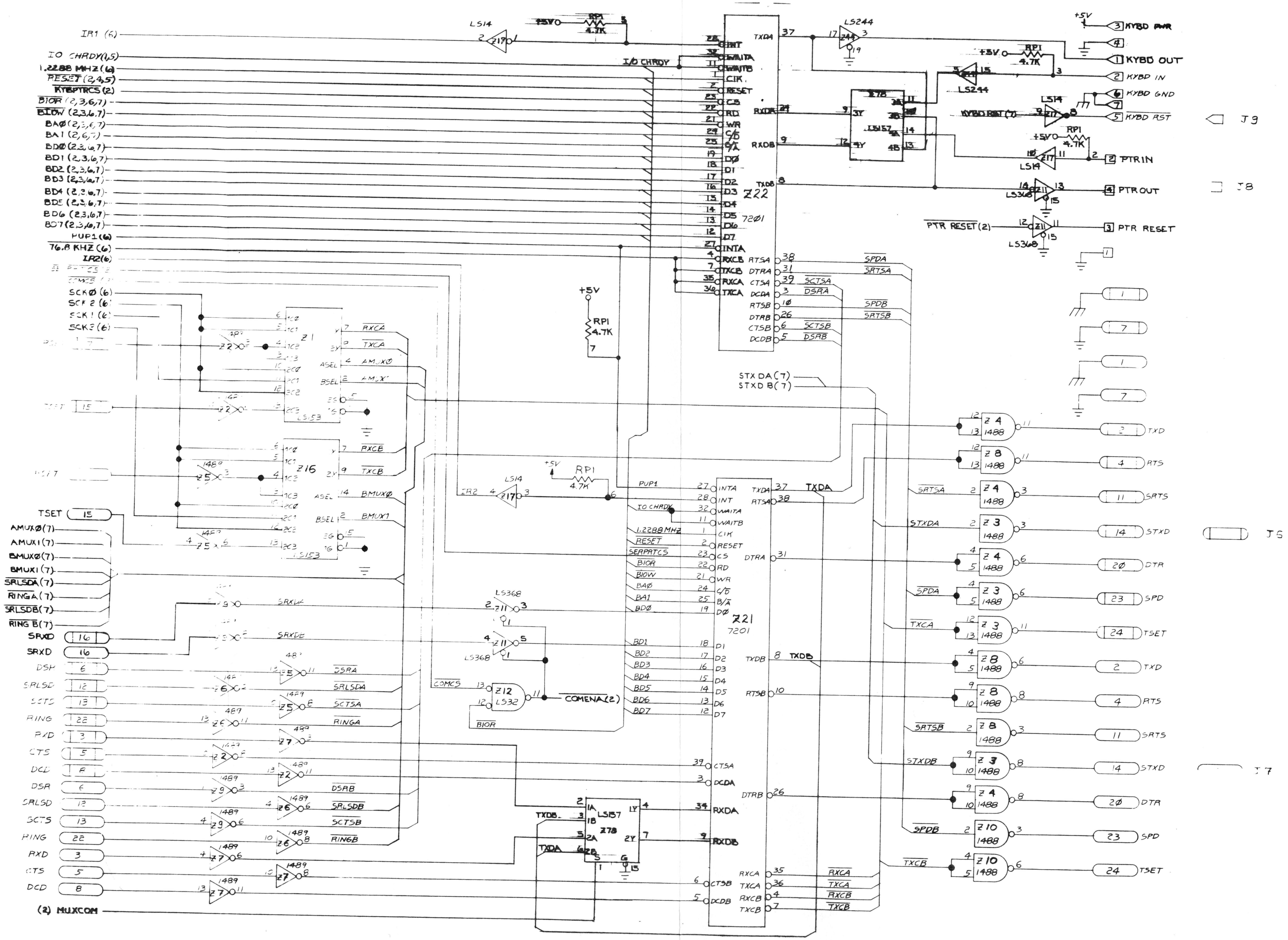

IR1 (6)
IO CHRDY(1,5)
1.2288 MHZ (6)
RESET (2,4,5)
KYBPTRCS (2)
BIOR (2,3,6,7)
BIOW (2,3,6,7)
BA0 (2,3,6,7)
BA1 (2,6,7)
BD0 (2,3,6,7)
BD1 (2,3,6,7)
BD2 (2,3,6,7)
BD3 (2,3,6,7)
BD4 (2,3,6,7)
BD5 (2,3,6,7)
BD6 (2,3,6,7)
BD7 (2,3,6,7)
PUP1 (6)
76.8 KHZ (6)
IR2 (6)
SCK0 (6)
SCK2 (6)
SCK1 (6)
SCK3 (6)
TSET
AMUX0 (7)
AMUX1 (7)
BMUX0 (7)
BMUX1 (7)
SRLSDA (7)
RINGA (7)
SRLSDB (7)
RING B (7)
SRXD
DSR
SRLSD
SCTS
RING
RXD
CTS
DCD
(2) MUXCOM
LS14
+5V
RP1
4.7K
I/O CHRDY
Z22
7201
TXDA
RXDA
RXDB
TXDB
RTSA
DTRA
CTSA
DCDA
RTSB
DTRB
CTSB
DCDB
LS244
LS157
Z78
KYBD PWR
KYBD OUT
KYBD IN
KYBD GND
KYBD RST
KYBD RST (7)
PTRIN
PTROUT
PTR RESET
PTR RESET (2)
LS368
J9
J8
Z1
Z16
LS153
RXCA
TXCA
AMUX0
AMUX1
RXCB
TXCB
BMUX0
BMUX1
STX DA (7)
STXD B (7)
PUP1
Z21
7201
COMCS
Z12
LS32
COMENA (2)
1489
1488
DSRA
SRLSDA
SCTSA
RINGA
DSRB
SRLSDB
SCTSB
RINGB
SPDA
SRTSA
SPDB
SRTSB
STXDA
STXDB
TXD
RTS
SRTS
STXD
DTR
SPD
J5
J7

Figure 6-12. I/O Mother Board Assembly and Rear Panel Assembly (A9A2) Parts Location and Schematic Diagrams (Sheet 10 of 14).

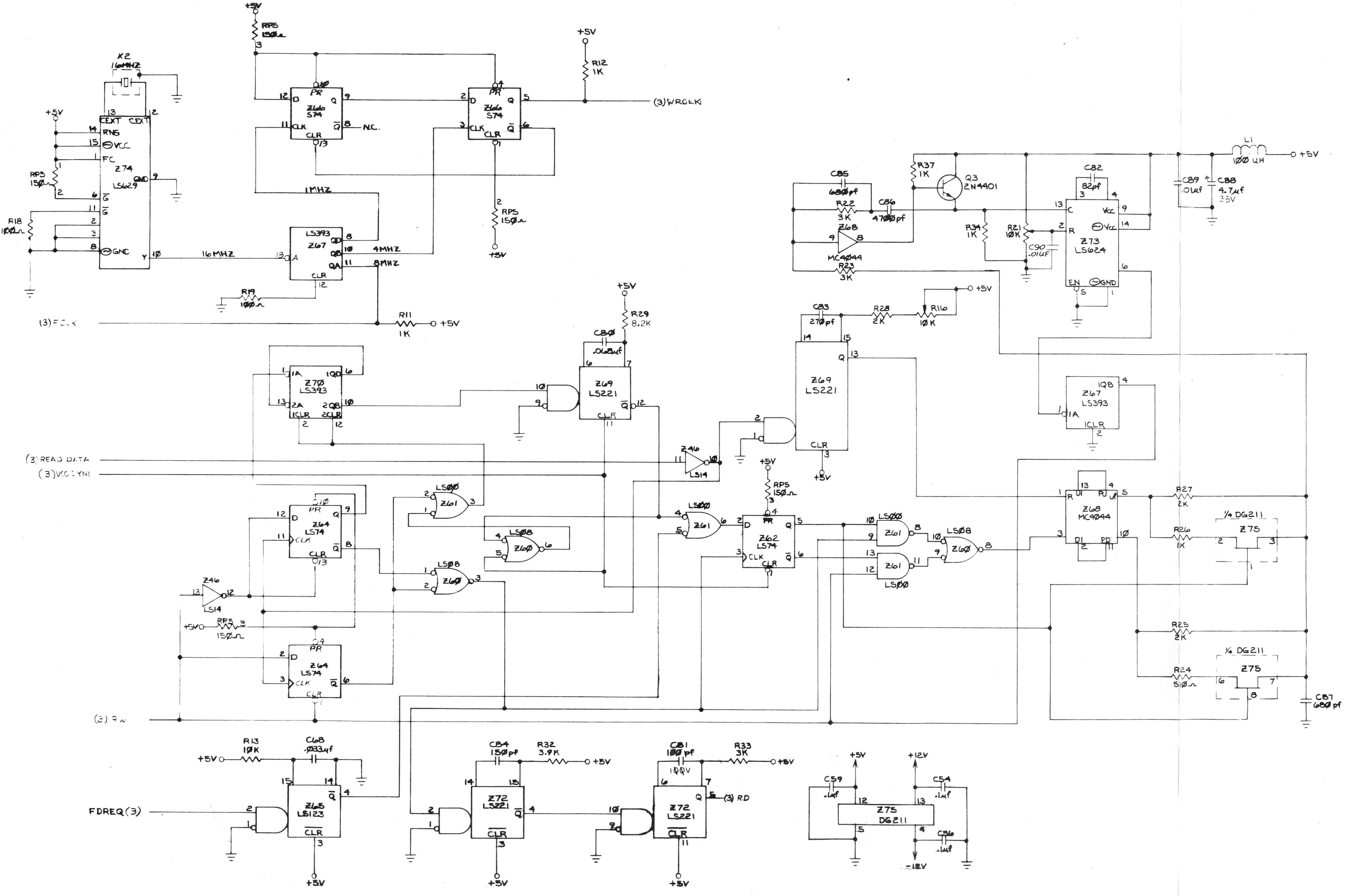
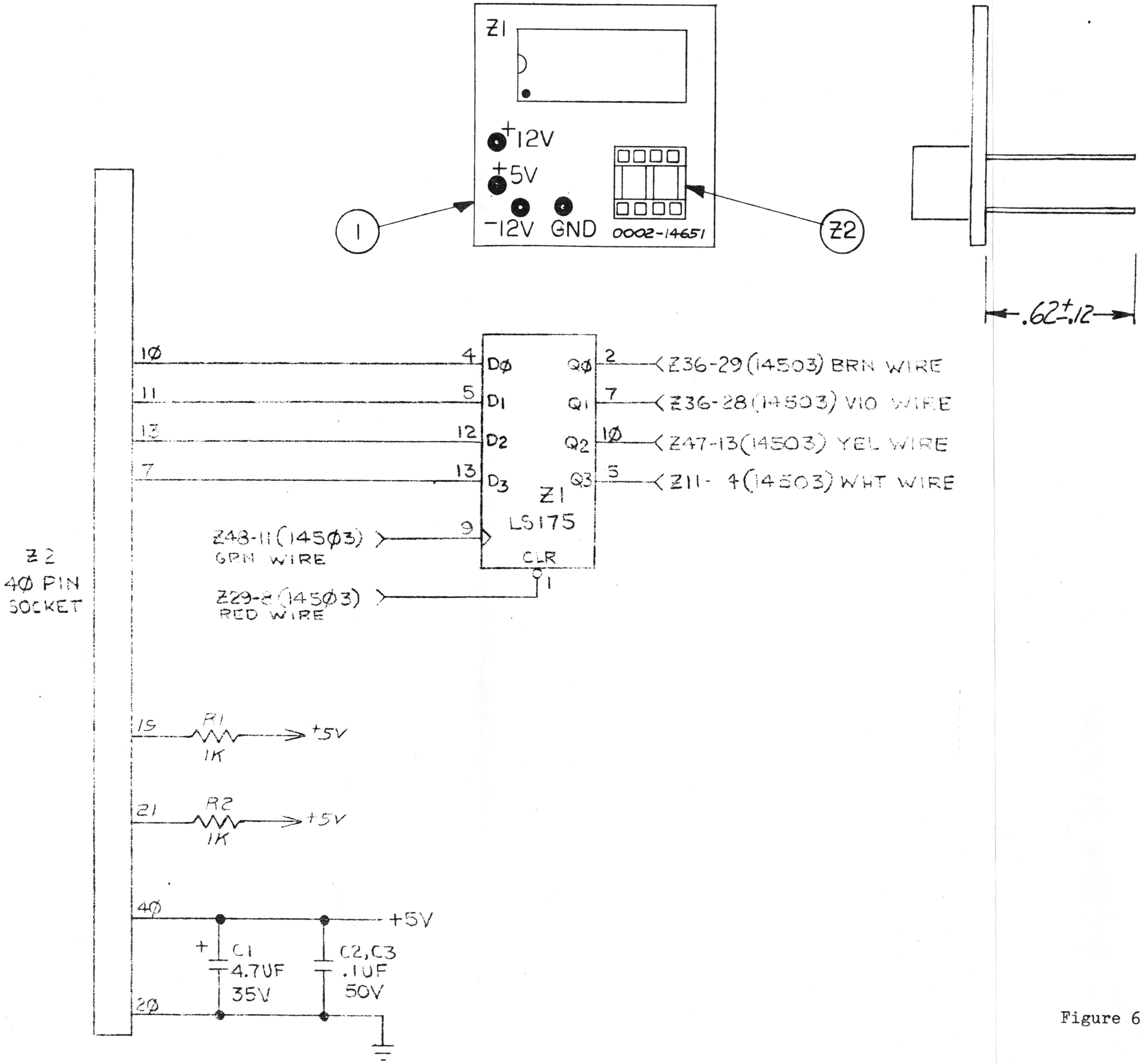

X2
16MHZ
Z74
LS629
RNG
VCC
FC
GND
RP5
150Ω
R18
100Ω
16MHZ
+5V
Z66
S74
PR
CLR
CLK
N.C.
1MHZ
LS393
Z67
4MHZ
8MHZ
R19
100Ω
(3) FCLK
R11
1K
R12
1K
(3) WRCLK
Z70
LS393
Z69
LS221
C80
.068µf
R29
8.2K
(3) READ DATA
(3) VCO SYNC
Z46
LS14
Z64
LS74
LS00
Z61
LS08
Z60
Z62
LS74
(3) R/W
C83
270pf
R28
2K
R16
10K
C85
680pf
R22
3K
C86
4700pf
Z68
MC4044
R23
3K
R37
1K
Q3
2N4401
R34
1K
R21
10K
C90
.01µF
C82
82pf
Z73
LS624
C89
.01µf
C88
4.7µf
35V
L1
100 µH
1Q8
1A
1CLR
R27
2K
R26
1K
1/4 DG211
Z75
R25
2K
R24
510Ω
C87
680 pf
FDREQ (3)
R13
10K
C68
.033µf
Z65
LS123
C84
150pf
R32
3.9K
Z72
LS221
C81
100 pf
100V
R33
3K
(3) RD
C59
.1µf
+12V
C54
.1µf
DG211
C56
.1µf
-12V

Figure 6-12. I/O Mother Board Assembly and Rear Panel Assembly (A9A2) Parts Location and Schematic Diagrams (Sheet 11 of 14).


Z1
+12V
+5V
-12V
GND
0002-14651
①
Z2
.62±.12
Z2
40 PIN
SOCKET
10
11
13
7
4 D0
5 D1
12 D2
13 D3
Q0 2
Q1 7
Q2 10
Q3 5
Z1
LS175
CLR
1
9
Z36-29 (14503) BRN WIRE
Z36-28 (14503) VIO WIRE
Z47-13 (14503) YEL WIRE
Z11- 4 (14503) WHT WIRE
Z48-11 (14503)
GRN WIRE
Z29-8 (14503)
RED WIRE
15
R1
1K
+5V
21
R2
1K
+5V
40
+5V
20
C1
4.7UF
35V
C2,C3
.1UF
50V

NOTES:

1. FOR LIST OF MATERIALS SEE A0002-14651.
2. FOR CIRCUIT SCHEMATIC SEE B0003-14651.

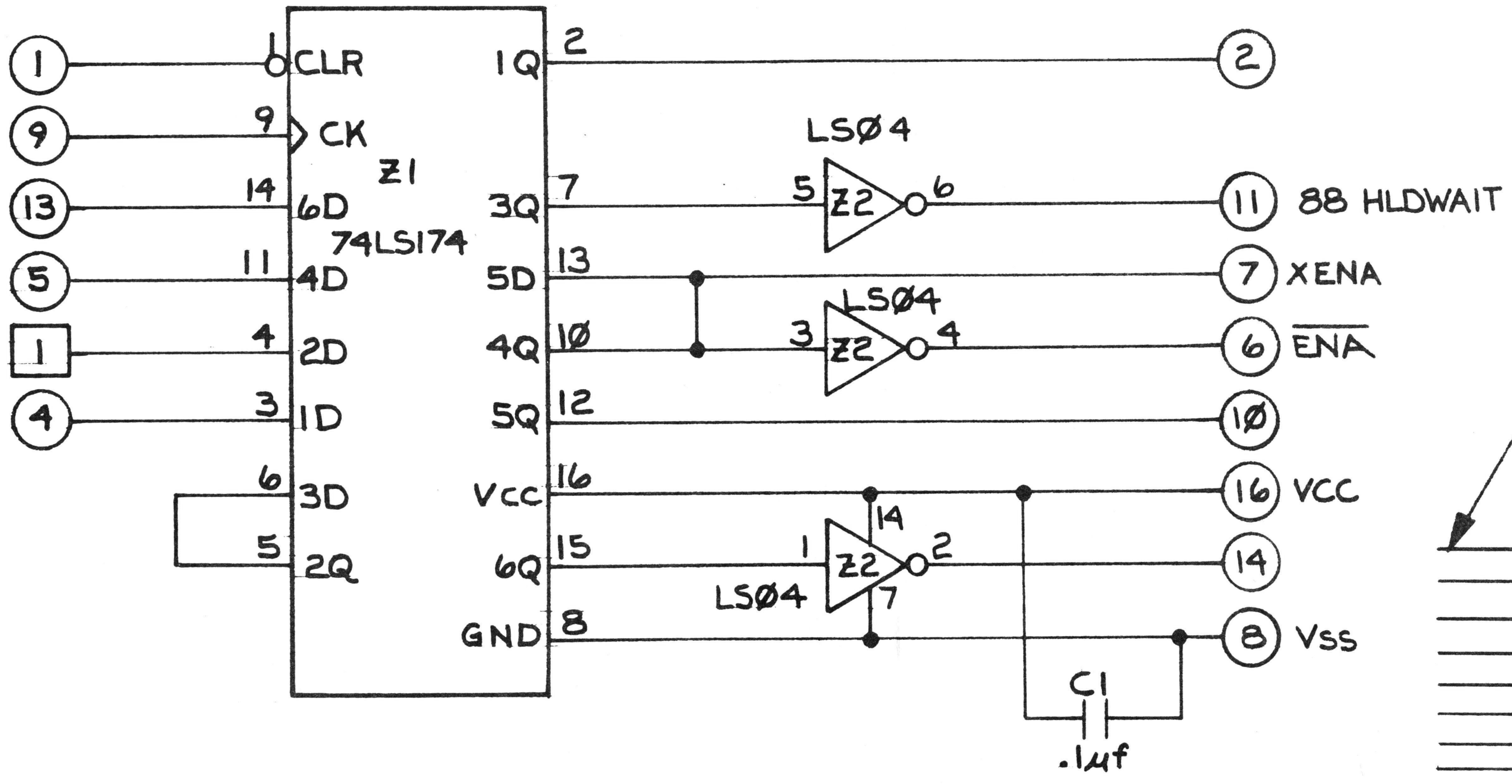
WIRE COLOR
+5V - RED
GND - BLACK
+12V - ORANGE
-12V - GREEN

Figure 6-12. I/O Mother Board Assembly and Rear Panel Assembly (A9A2) Parts Location and Schematic Diagrams (Sheet 12 of 14).

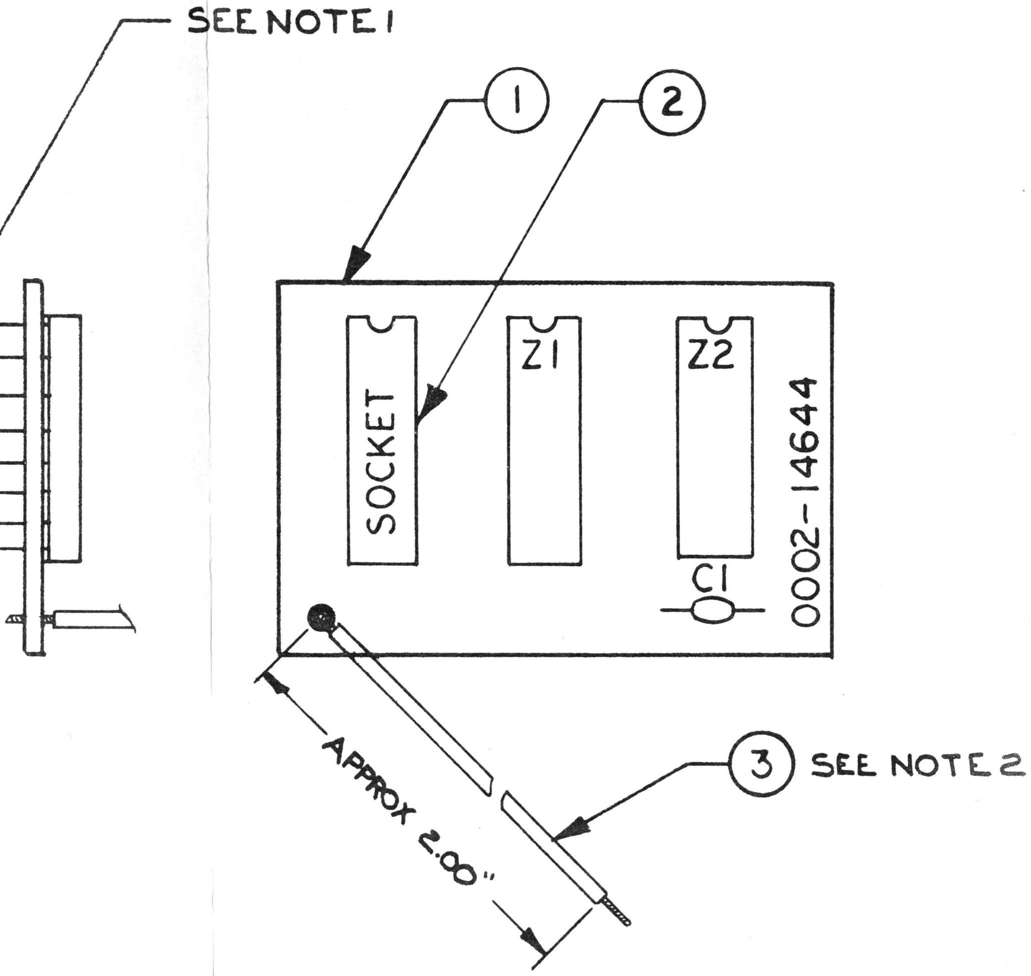
CONNECTOR KEY

☐ = PLATED THROUGH CONNECTING HOLE

○ = 16 PIN "IC" SOCKET



1
9
13
5
1
4
CLR
CK
6D
4D
2D
1D
3D
2Q
Z1
74LS174
1Q
3Q
5D
4Q
5Q
Vcc
6Q
GND
LS04
Z2
2
11 88 HLDWAIT
7 XENA
6 ENA
10
16 VCC
14
8 Vss
C1
.1uf

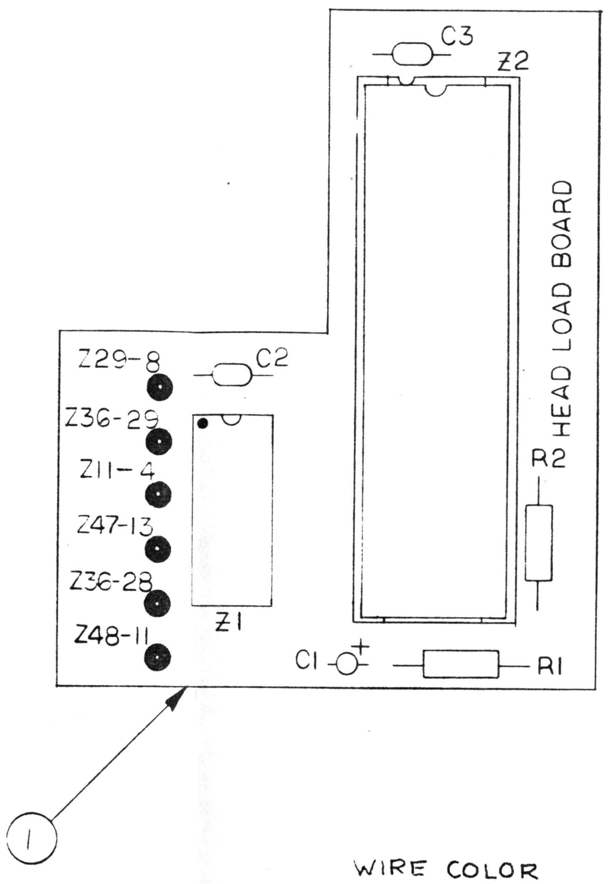


SEE NOTE 1
1
2
SOCKET
Z1
Z2
C1
0002-14644
APPROX 2.00"
3 SEE NOTE 2

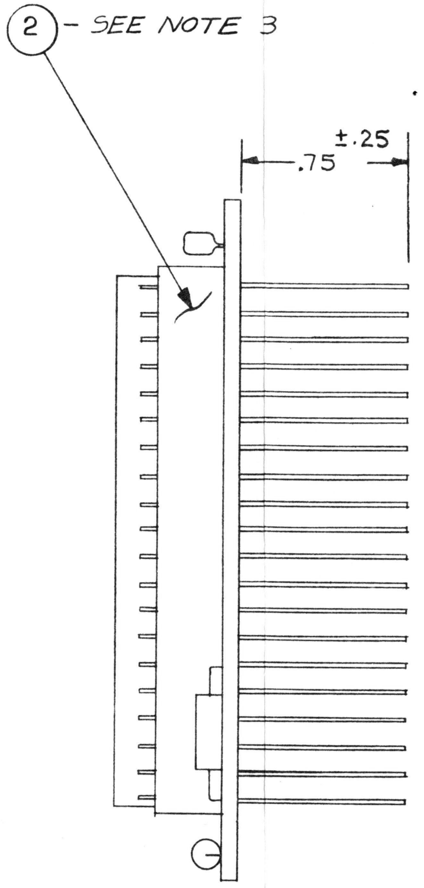
NOTE:
THIS PCB IS INTENDED TO BE A PLUG IN MODULE ON THE Z80 IO (0010-14503) REV. 3 SOCKET Z50

Figure 6-12. I/O Mother Board Assembly and Rear Panel Assembly (A9A2) Parts Location and Schematic Diagrams (Sheet 13 of 14).

NOTES:
1. AFTER INSTALLATION OF SOCKET (ITEM 2) DO NOT TRIM LEADS.
2. USING 20 AWG WIRE STRIP & TIN APROX 1/4" BOTH ENDS



C3
Z2
HEAD LOAD BOARD
R2
Z29-8
C2
Z36-29
Z11-4
Z47-13
Z36-28
Z48-11
Z1
C1
R1
1



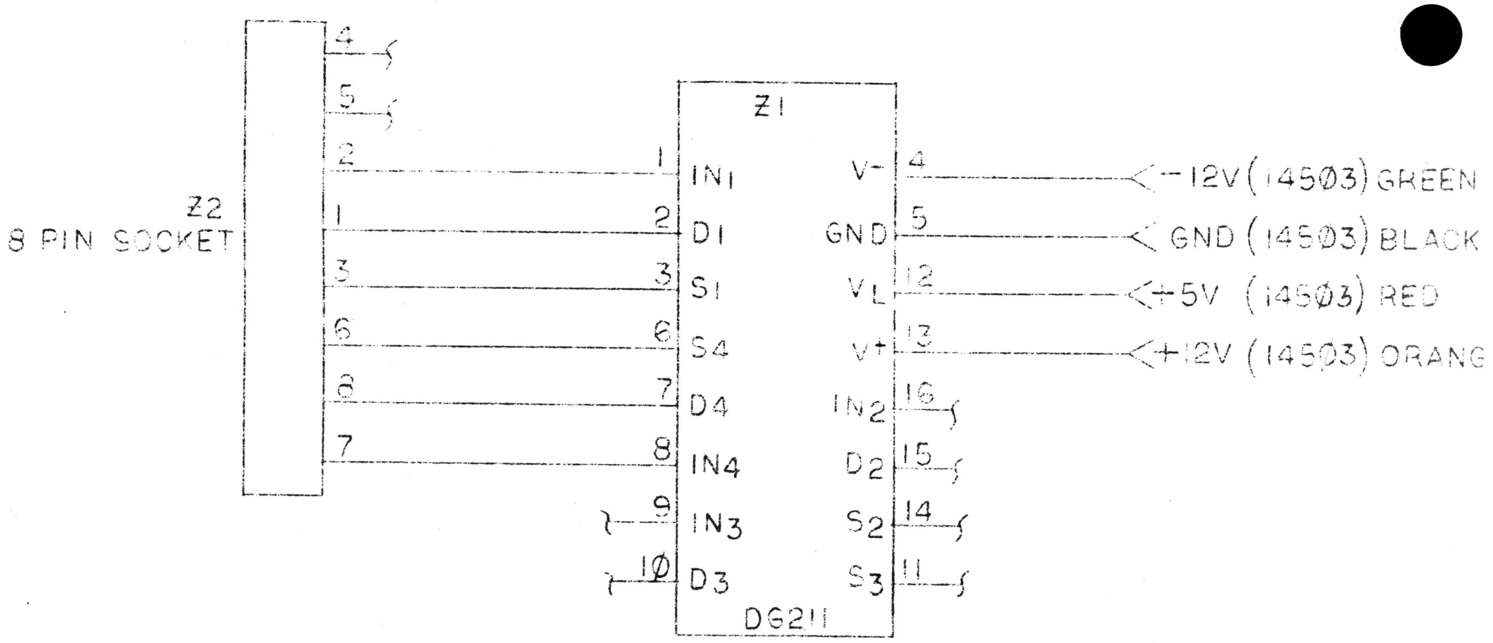
2 - SEE NOTE 3
±.25
.75

WIRE COLOR

Z29-8- RED
Z36-29- BROWN
Z11-4- WHITE
Z47-13- YELLOW
Z36-28- VIOLET
Z48-11- GREEN

NOTES:

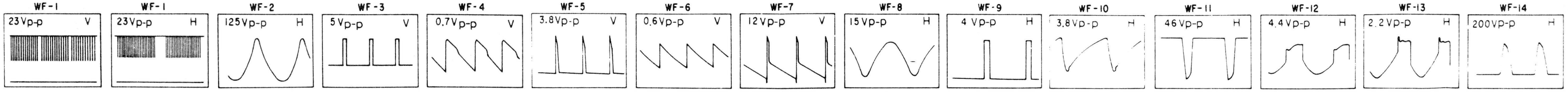
1. *FOR LIST OF MATERIALS SEE A0002-14676.*
2. *FOR CIRCUIT SCHEMATIC SEE B0003-14676.*
3. *CUT PINS 28 AND 29 OF SOCKET (REF. DES. 2), BEFORE ASSEMBLY.*

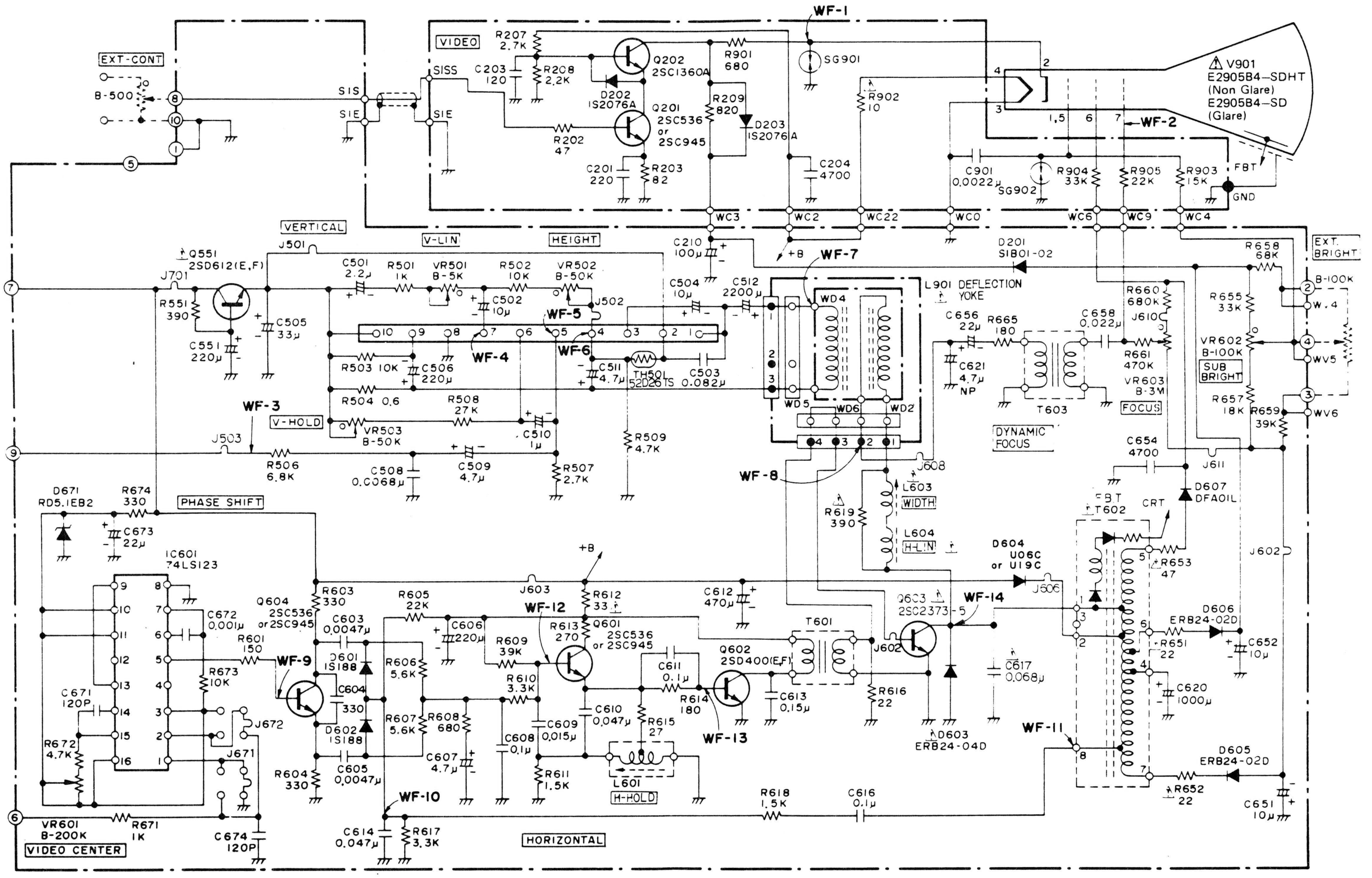


Z2
8 PIN SOCKET
Z1
IN1
D1
S1
S4
D4
IN4
IN3
D3
V-
GND
VL
V+
IN2
D2
S2
S3
DG211
-12V (14503) GREEN
GND (14503) BLACK
+5V (14503) RED
+12V (14503) ORANG

Figure 6-12. I/O Mother Board Assembly and Rear Panel Assembly (A9A2) Parts Location and Schematic Diagrams (Sheet 14 of 14).

SCHEMATIC DIAGRAM




EXT-CONT
B-500
8
10
1
5
7
9
6
SIS
SIE
SISS
SIE
VIDEO
R207
2.7K
C203
120
R208
2.2K
Q202
2SC1360A
D202
1S2076A
Q201
2SC536
or
2SC945
R202
47
C201
220
R203
82
R901
680
R209
820
D203
1S2076A
C204
4700
WF-1
SG901
R902
10
4
2
3
1,5
6
7
WF-2
V901
E2905B4–SDHT
(Non Glare)
E2905B4–SD
(Glare)
FBT
GND
C901
0.0022μ
SG902
R904
33K
R905
22K
R903
15K
WC3
WC2
WC22
WC0
WC6
WC9
WC4
VERTICAL
J501
V-LIN
HEIGHT
Q551
2SD612(E,F)
J701
R551
390
C551
220μ
C505
33μ
C501
2.2μ
R501
1K
VR501
B-5K
C502
10μ
R502
10K
VR502
B-50K
J502
WF-5
WF-4
WF-6
10
9
8
7
6
5
4
3
2
1
R503 10K
C506
220μ
R504 0.6
R508
27K
C511
4.7μ
TH501
52D26TS
C503
0.082μ
WF-3
V-HOLD
VR503
B-50K
C510
1μ
J503
R506
6.8K
C508
0.0068μ
C509
4.7μ
R507
2.7K
R509
4.7K
C210
100μ
+B
WF-7
C504
10μ
C512
2200μ
D201
S1B01-02
L901 DEFLECTION
YOKE
WD4
WD5
WD6
WD2
WF-8
J608
L603
WIDTH
R619
390
L604
H-LIN
C656
22μ
R665
180
C621
4.7μ
NP
T603
DYNAMIC
FOCUS
C658
0.022μ
R660
680K
J610
R661
470K
VR603
B-3M
FOCUS
EXT.
BRIGHT
R658
68K
B-100K
W.4
WV5
WV6
R655
33K
VR602
B-100K
SUB
BRIGHT
R657
18K
R659
39K
C654
4700
J611
D607
DFA01L
FBT
T602
CRT
J602
R653
47
D606
ERB24-02D
R651
22
C652
10μ
C620
1000μ
D605
ERB24-02D
R652
22
C651
10μ
WF-11
D604
U06C
or U19C
J606
D671
RD5.1EB2
R674
330
PHASE SHIFT
C673
22μ
IC601
74LS123
C672
0.001μ
R601
150
R673
10K
C671
120P
R672
4.7K
J672
J671
VR601
B-200K
VIDEO CENTER
R671
1K
C674
120P
Q604
2SC536
or 2SC945
R603
330
WF-9
C603
0.0047μ
D601
1S188
C604
330
D602
1S188
C605
0.0047μ
R604
330
WF-10
C614
0.047μ
R617
3.3K
R605
22K
C606
220μ
R606
5.6K
R607
5.6K
R608
680
C607
4.7μ
C608
0.1μ
J603
+B
R612
33
WF-12
R613
270
Q601
2SC536
or 2SC945
R609
39K
R610
3.3K
C609
0.015μ
C610
0.047μ
R611
1.5K
C611
0.1μ
R615
27
L601
H-HOLD
R614
180
HORIZONTAL
C612
470μ
Q602
2SD400(E,F)
WF-13
C613
0.15μ
T601
J602
Q603
2SC2373-5
WF-14
R616
22
D603
ERB24-04D
C617
0.068μ
R618
1.5K
C616
0.1μ

DO NOT SCALE THIS DRAWING

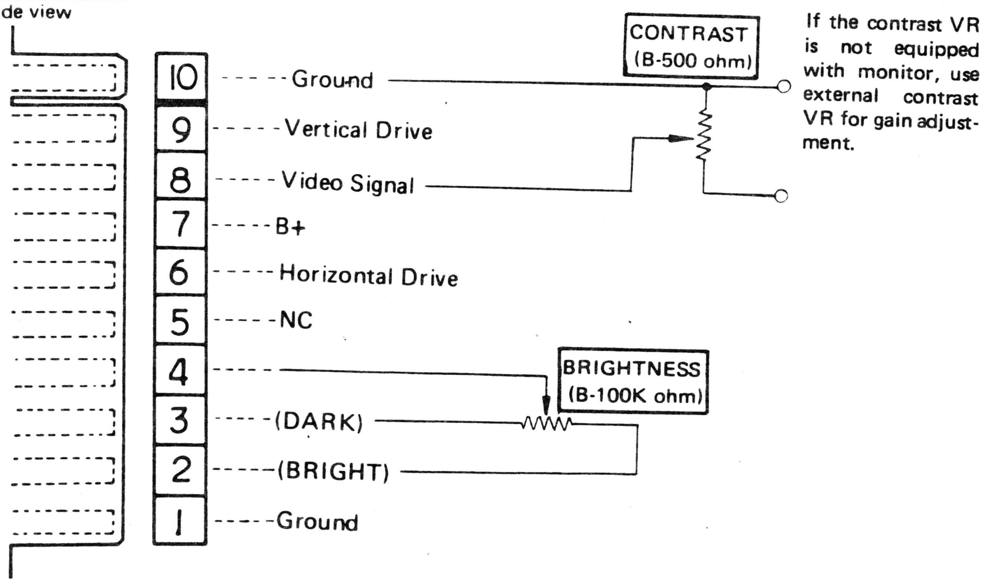
Ⓑ Additional V901 (May, 1983)
REVISION
Ⓐ D604 (Feb. 1983)

NOTES:
1. All resistance values in ohm. K=1,000 M=1,000,000
2. Unless otherwise noted in schematic diagram, all capacitors less than 1 are expressed in mfd (μF) and the values larger than 1 are in pF.
3. Voltage reading taken with High Impedance Voltmeter from point indicated chassis ground, contrast at max., other controls at normal, local linevoltage (or specified DC 12V). Voltage reading may vary ±20%.
4. This is a fundamental circuit diagram. Some production changes may be made without revision of the diagram.
5. ⚠ Shows SAFETY use only equivalent replacement parts.

SCALE	TITLE	SCHEMATIC DIAGRAM	FILE CODE TM82-005
DRAWN	MODEL	DK7459NL	PAGE # PAGES 29/33
CHECKED	SANYO	TOKYO SANYO ELECTRIC CO., LTD. ELECTRONICS DIVISION	

Figure 6-13. CRT Video Board Assembly (A10) Parts Location and Schematic Diagrams (Sheet 1 of 9).

PIN CONNECTION


Parts side view
10 Ground
9 Vertical Drive
8 Video Signal
7 B+
6 Horizontal Drive
5 NC
4
3 (DARK)
2 (BRIGHT)
1 Ground
CONTRAST
(B-500 ohm)
BRIGHTNESS
(B-100K ohm)

If the contrast VR is not equipped with monitor, use external contrast VR for gain adjustment.

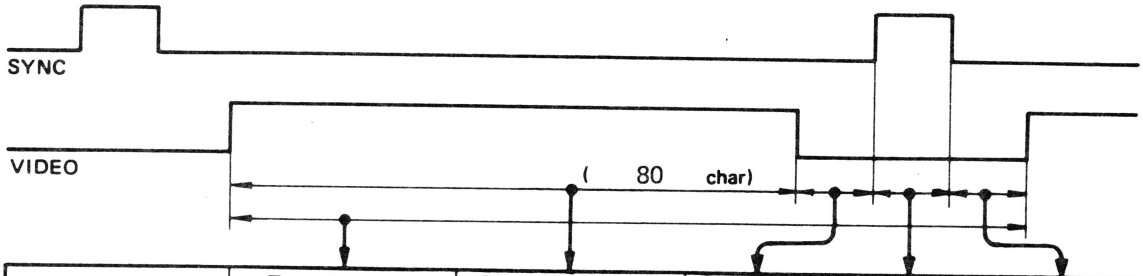
MATING CONNECTER

Viking	2VK10S/1-2
Amphenol	225-21031-101
Cinch	250-10-30-170
Amp	583332-1
Hirose	CR7E-20DA-101
Kel	1168-020-009
Daiich densi	225J-21011-188

CHARACTER INFORMATION

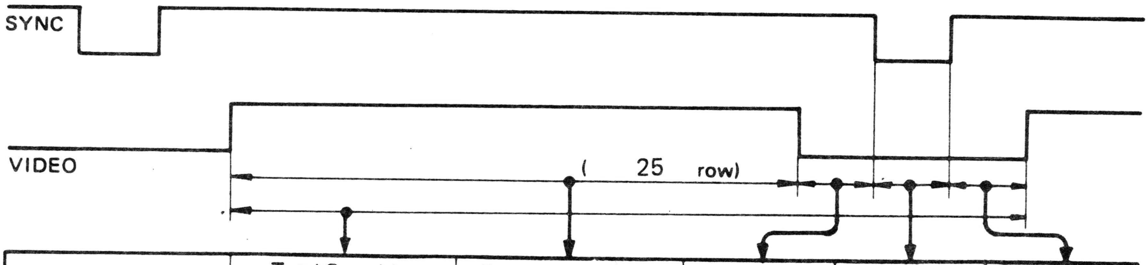
CHARACTER	(5 x 7)* dots	DOT CLOCK	11.7936 MHz
CHARACTER BLOCK	7 X 10 dots	CHARACTER CLOCK	1.6848 MHz

HORIZONTAL TIMING


SYNC
VIDEO
(80 char)

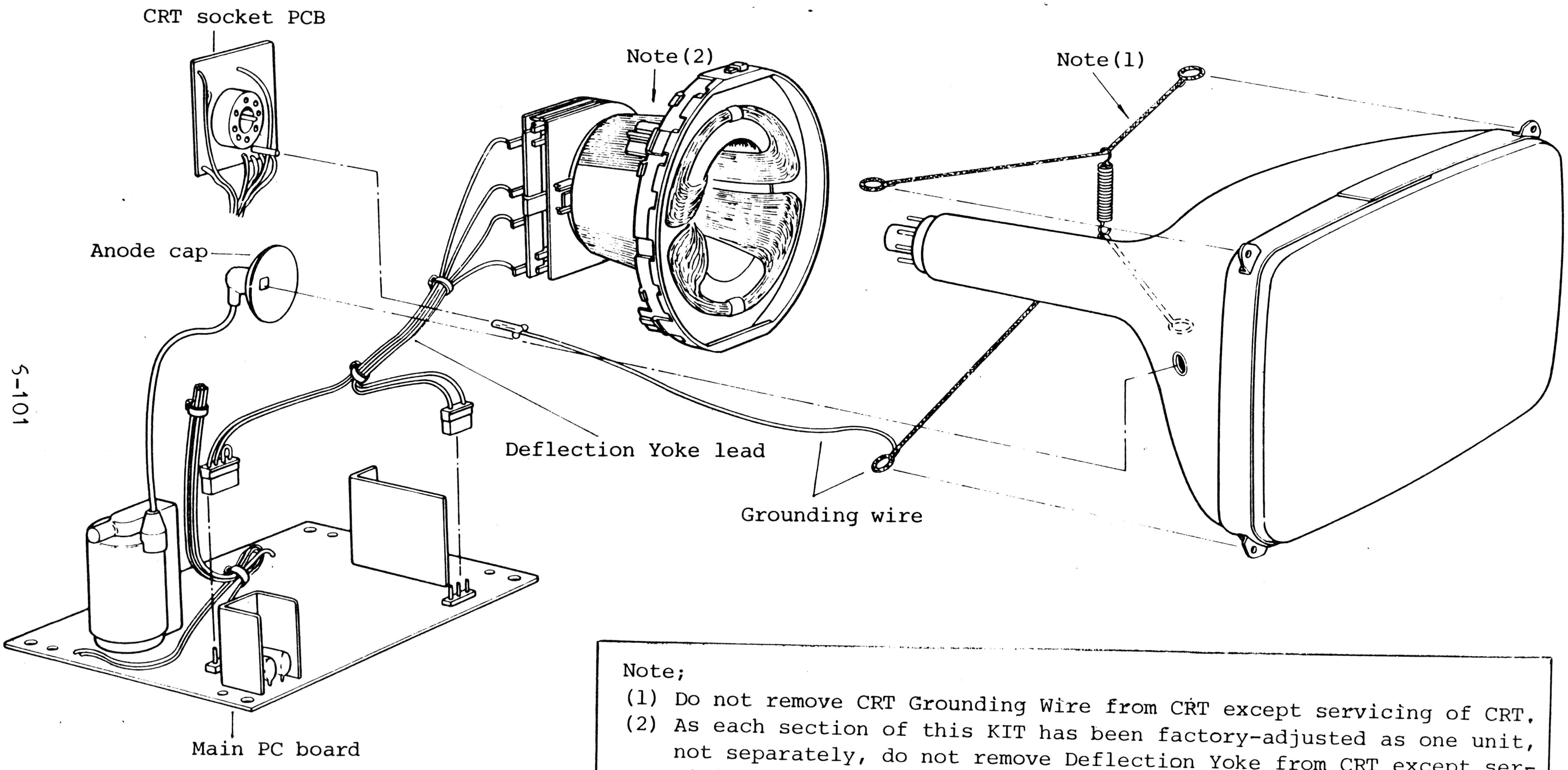
	Total Character	Display Character	Front Porch	Sync Signal	Back Porch
Horizontal Rate	104 Char	80 Char	0 Char	24 Char	0 Char
16.2 kHz	61.73 uS	47.48 uS	0 uS	14.25 uS	0 uS

VERTICAL TIMING


SYNC
VIDEO
(25 row)

	Total Scan Line	Display Scan Line	Up to Sync	Sync Signal	Up to Video
Vertical Rate	270 Line	250 Line	0 Line	20 Line	0 Line
60 Hz	16.67 mS	15.43 mS	0 mS	1.24 mS	0 mS

Figure 6-13. CRT Video Board Assembly (A10) Parts Location and Schematic Diagrams (Sheet 2 of 9).


CRT socket PCB
Note(2)
Note(1)
Anode cap
Deflection Yoke lead
Grounding wire
Main PC board

Note;

(1) Do not remove CRT Grounding Wire from CRT except servicing of CRT.

(2) As each section of this KIT has been factory-adjusted as one unit, not separately, do not remove Deflection Yoke from CRT except servicing of CRT or Deflection Yoke.

Figure 6-13. CRT Video Board Assembly (A10) Parts Location and Schematic Diagrams (Sheet 3 of 9).

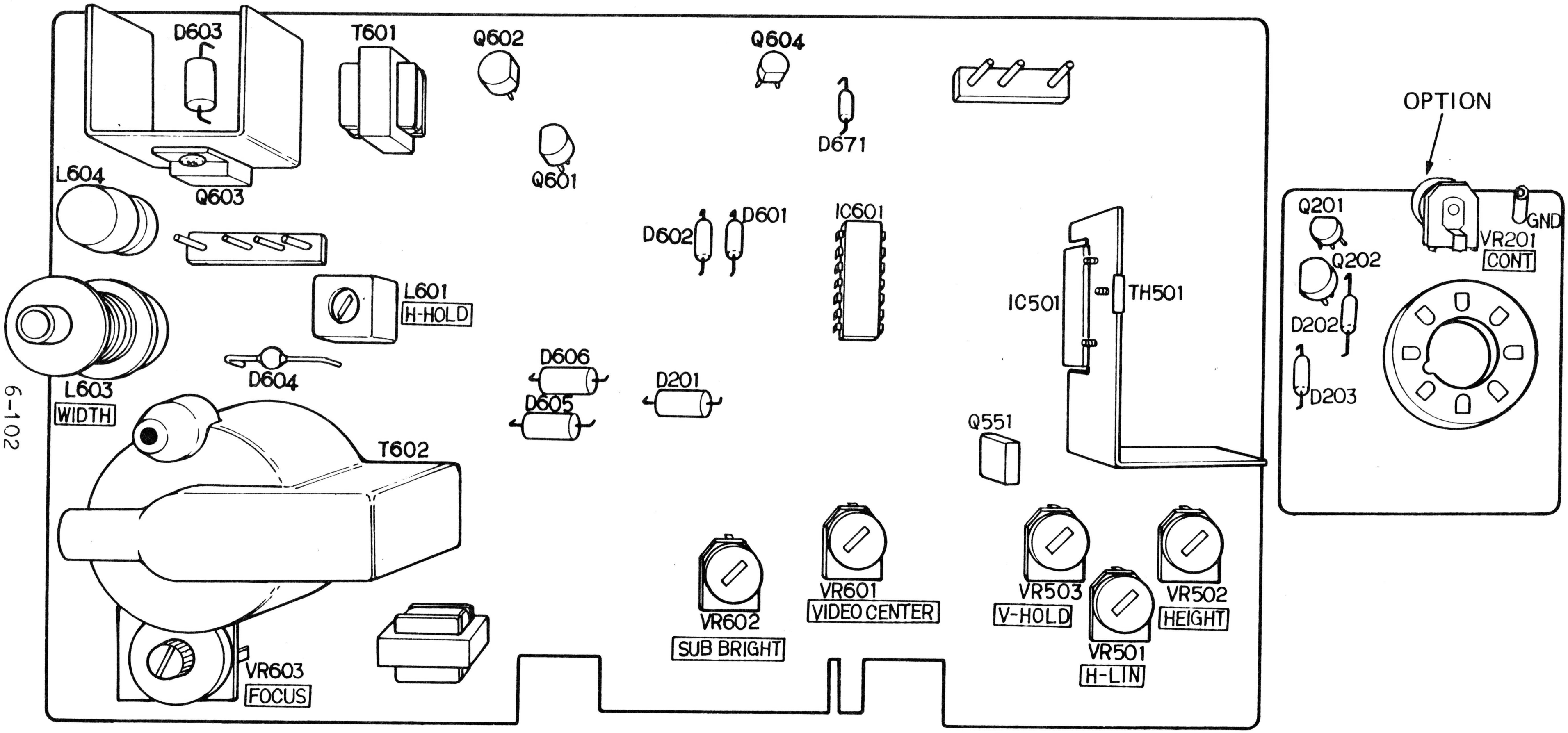

D603
T601
Q602
Q604
D671
OPTION
L604
Q603
Q601
Q201
GND
D602
D601
IC601
VR201
CONT
Q202
L601
H-HOLD
IC501
TH501
D202
D606
D604
L603
WIDTH
D201
D605
D203
Q551
T602
VR601
VIDEO CENTER
VR503
V-HOLD
VR502
HEIGHT
VR602
SUB BRIGHT
VR501
H-LIN
VR603
FOCUS

Figure 6-13. CRT Video Board Assembly (A10) Parts Location and Schematic Diagrams (Sheet 4 of 9).

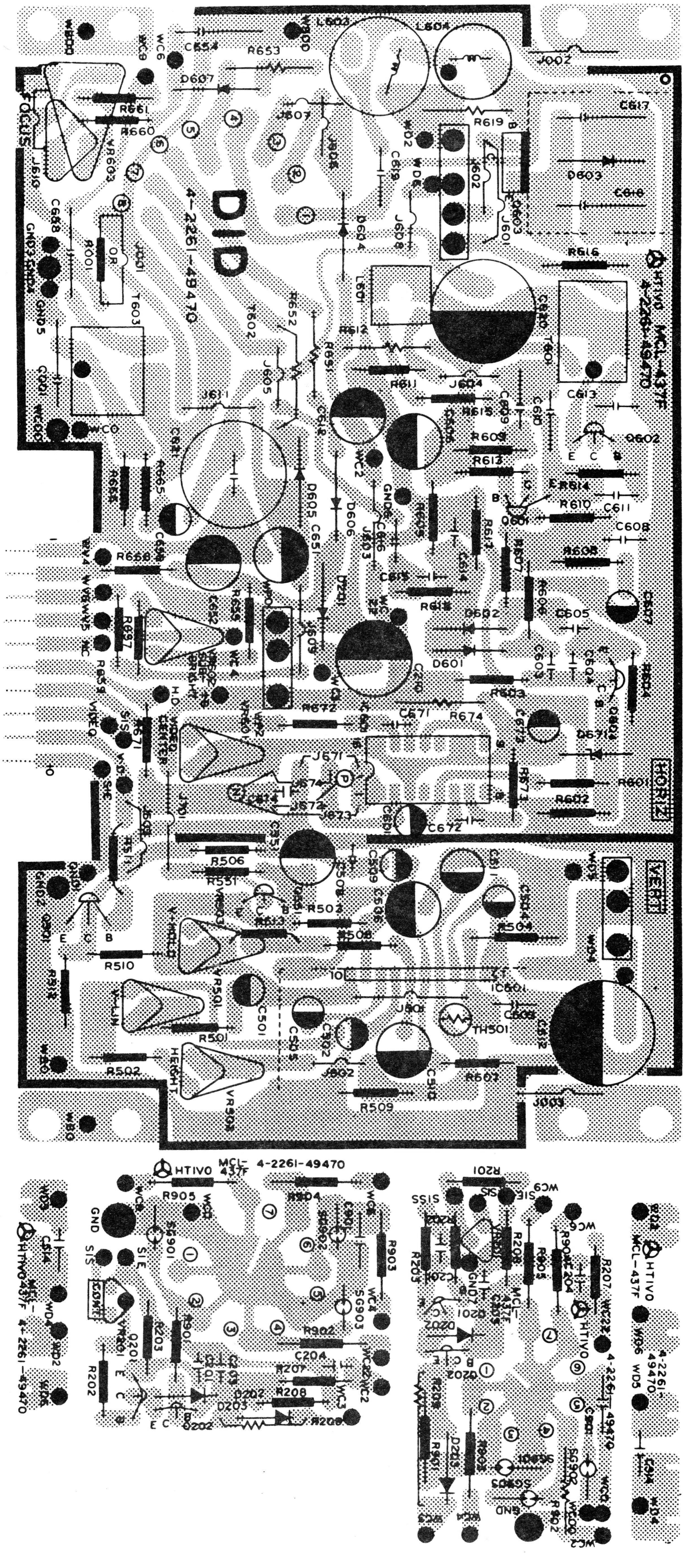


Figure 6-13. CRT Video Board Assembly (A10) Parts Location and Schematic Diagrams (Sheet 5 of 9).

PARTS LIST

NOTES: 1. Parts orders must contain Model Number, Parts Number and Description.
2. Ordering quantity of resistors, capacitors and screws must be multiple of 10 pcs.
3. ⚠ mark shows SAFETY use only equivalent replacement part.

Schematic Location	Parts No.	Description	Q'ty
CHASSIS PARTS			
	111 2 6211 22660	HOR PAD PLATE-TJJ	1
	111 2 6211 22770	VERT PAD PLATE-TJJ	1
	111 2 6211 26970	RADIATOR-MDZ	1
	111 2 7211 14870	WIRE BAND-THJ-B	4
PACKING MATERIALS			
	114 6 1139 00100	CORR CASE-MDT	1
	114 6 3119 00100	TOP INNER CUSH-MDT	1
	114 6 3119 00200	BOT INNER CUSH-MDT	1
	114 6 3139 00100	CORR SLEEVE-MDT	1
	114 6 3139 00200	FBT PAD-MDT	1
	114 6 3139 00300	CORR PAD-MDT	1
	114 6 3139 00900	CORR SLEEVE-MDT-B	1
	114 6 3139 01000	CORR PAD-MDT-B	2
ACCESSORIES & LABELS			
	111 6 4721 31771	CAUTION LABEL-MEG-B	1
	114 2 1339 00500	NAME LABEL MDT	1
SCREWS—CHASSIS			
	102 3 2203 00802	SBRT2, 3.0x8, Z1	1
	102 3 2203 00601	SBRT2, 3.0x6, Z1	3
ELECTRICAL PARTS			
L601	4 2731 06170	HORIZ OSC COIL	1
⚠ L603	4 2741 07170	HOR WIDTH COIL	1
⚠ L604	4 2749 00100	LINEARITY COIL	1
⚠ L901	4 2761 53170	DEFLECTION YOKE	1
T601	4 2731 06270	HORIZ DRIVE TRANS	1
⚠ T602	4 2751 52900	FLYBACK TRANS	1
T603	4 2731 07270	FOCUS TRANS	1
SMALL PARTS			
	4 2350 61600	TERMINAL SOCKET	1
	4 2351 05670	CRT SOCKET	1
	4 2360 04300	GT PIN	1
	4 2361 07270	3P MINI PIN	1
	4 2361 07370	4P MINI PIN	1
	111 0 9081 03053	3P SOCKET ASSY	1
	111 0 9081 04034	4P SOCKET ASSY	1
	114 0 4189 00100	GND CONN-MDT	1
SG901	4 2341 06270	SPARK GAP	1
or	4 2341 07770	SPARK GAP	1
SG902	4 2341 06270	SPARK GAP	1
or	4 2341 07770	SPARK GAP	1

DO NOT SCALE THIS DRAWING.

Figure 6-13. CRT Video Board Assembly (A10) Parts Location and Schematic Diagrams (Sheet 6 of 9).

PARTS LIST

Schematic Location	Parts No.	Description				Q'ty
VARIABLE RESISTORS						
VR501	4 2221 43770	9CVFR4B-5K				1
VR502	4 2221 43570	9CVFR4B-50K				1
VR503	4 2221 43570	9CVFR4B-50K				1
VR601	4 2229 00122	9CVFR4B-200K				1
VR602	4 2221 43670	9CVFR4B-100K				1
VR603	4 2221 36170	15CVFR8B-3M				1
CAPACITORS						
C201	C1HYDK221W--	CERAMIC	220P	W	50V	1
C203	C1HYFK121W--	CERAMIC	120P	W	50V	1
C204	C1HYFP472Z--	CERAMIC	4700P	Z	50V	1
C210	C2ARF-107A--	ELECT	100M		100V	1
C501	C1HRE-225A--	ELECT	2.2M		50V	1
C502	C1CRE-106A--	ELECT	10M		16V	1
C503	C1HFRK823A--	MYLAR	0.082M		50V	1
C504	C1CRE-106A--	ELECT	10M		16V	1
C505	C1CRF-336A--	ELECT	33M		16V	1
C506	C1CRF-227A--	ELECT	220M		16V	1
C508	C1HFRK682A--	MYLAR	0.0068M		50V	1
C509	C1ERE-475A--	ELECT	4.7M		25V	1
C510	C1ETDM105A--	TANTAL	1M		25V	1
or	C1EUEM105A--	ELECT	1M		25V	1
C511	C1CTDM475A--	TANTAL	4.7M		16V	1
or	C1EEEM475S--	ELECT	4.7M		25V	1
C512	C1ARF-228A--	ELECT	2200M		10V	1
C551	C1CRF-227A--	ELECT	220M		16V	1
C603	C1HFRK472A--	MYLAR	0.0047M		50V	1
C604	C1HYDK331W--	CERAMIC	330P	W	50V	1
C605	C1HFRK472A--	MYLAR	0.0047M		50V	1
C606	C1CRF-227A--	ELECT	220M		16V	1
C607	C1ERE-475A--	ELECT	4.7M		25V	1
C608	C1HFRK104A--	MYLAR	0.1M		50V	1
C609	C2AQFK153A--	POLYPR	0.015M		100V	1
C610	C1HFRK473A--	MYLAR	0.047M		50V	1
C611	C1HFRK104A--	MYLAR	0.1M		50V	1
C612	C1ERF-477A--	ELECT	470M		25V	1
C613	C1HFRK154A--	MYLAR	0.15M		50V	1
C614	C1HFRK473A--	MYLAR	0.047M		50V	1
C616	C1HFRK104A--	MYLAR	0.1M		50V	1
⚠ C617	C2GQFK683A--	POLYPR	0.068M		400V	1
C620	C1VRF-108A--	ELECT	1000M		35V	1
C621	C1HAEM009T--	ELECT	4.7M		50V	1
C651	C2CRE-106A--	ELECT	10M		160V	1
C652	C2CRE-106A--	ELECT	10M		160V	1
C654	C3AKDM472W--	CERAMIC	4700P	W	1KV	1
C656	C1ERF-226A--	ELECT	22M		25V	1
C658	C2JQFK223A--	POLYPR	0.022M		630V	1
C671	C1HCFK121RH-	CERAMIC	120P	RH	50V	1
C672	C1HFRK102A--	MYLAR	0.001M		50V	1
C673	C1CRF-226A--	ELECT	22M		16V	1
C674	C1HYFK121W--	CERAMIC	120P	W	50V	1
C901	C2JQFK222A--	POLYPR	0.0022M		630V	1

DO NOT SCALE THIS DRAWING.

Figure 6-13. CRT Video Board Assembly (A10) Parts Location and Schematic Diagrams (Sheet 7 of 9).

PARTS LIST

FIXED REGISTORS

Schematic Location	Parts No.	Description				Q'ty
R202	R2ENTJ470A	CARBON	47	1/4W	J	1
R203	R2ENTJ820A	CARBON	82	1/4W	J	1
R207	R2ENTJ272A	CARBON	2.7K	1/4W	J	1
R208	R2ENTJ222A	CARBON	2.2K	1/4W	J	1
R209	R3DXPJ821A	OXIDE-M	820	2W	J	1
R501	R2ENTJ102A	CARBON	1K	1/4W	J	1
R502	R2ENTJ103A	CARBON	10K	1/4W	J	1
R503	R2ENTJ103A	CARBON	10K	1/4W	J	1
R504	R3APPJ0R6A	OXIDE-M	0.6	1W	J	1
R506	R2ENTJ682A	CARBON	6.8K	1/4W	J	1
R507	R2ENTJ272A	CARBON	2.7K	1/4W	J	1
R508	R2ENTJ273A	CARBON	27K	1/4W	J	1
R509	R2ENTJ472A	CARBON	4.7K	1/4W	J	1
R551	R2ENTJ391A	CARBON	390	1/4W	J	1
R601	R2ENTJ151A	CARBON	150	1/4W	J	1
R603	R2ENTJ331A	CARBON	330	1/4W	J	1
R604	R2ENTJ331A	CARBON	330	1/4W	J	1
R605	R2ENTJ223A	CARBON	22K	1/4W	J	1
R606	R2ENTJ562A	CARBON	5.6K	1/4W	J	1
R607	R2ENTJ562A	CARBON	5.6K	1/4W	J	1
R608	R2ENTJ681A	CARBON	680	1/4W	J	1
R609	R2ESNJ393A	CARBON	39K	1/4W	J	1
R610	R2ENTJ332A	CARBON	3.3K	1/4W	J	1
R611	R2ENTJ152A	CARBON	1.5K	1/4W	J	1
⚠ R612	R2HCPK330A	SOLID	33	1/2W	K	1
R613	R2ENTJ271A	CARBON	270	1/4W	J	1
R614	R2ENTJ181A	CARBON	180	1/4W	J	1
R615	R2ENTJ270A	CARBON	27	1/4W	J	1
R616	R2HCPK220A	SOLID	22	1/2W	K	1
R617	R2ENTJ332A	CARBON	3.3K	1/4W	J	1
R618	R2ENTJ152A	CARBON	1.5K	1/4W	J	1
⚠ R619	R2HCPK391A	SOLID	390	1/2W	K	1
⚠ R651	R2HCPK220A	SOLID	22	1/2W	K	1
⚠ R652	R2HCPK220A	SOLID	22	1/2W	K	1
⚠ R653	R2HCPK470A	SOLID	47	1/2W	K	1
R655	R2ENTJ333A	CARBON	33K	1/4W	J	1
R657	R2ENTJ183A	CARBON	18K	1/4W	J	1
R658	R2ENTJ683A	CARBON	68K	1/4W	J	1
R659	R2ENTJ393A	CARBON	39K	1/4W	J	1
R660	R2ENTJ684A	CARBON	680K	1/4W	J	1
R661	R2ENTJ474A	CARBON	470K	1/4W	J	1
R665	R2HCPK181A	SOLID	180	1/2W	K	1
R671	R2ESNJ102A	CARBON	1K	1/4W	J	1
R672	R2ESNJ472A	CARBON	4.7K	1/4W	J	1
R673	R2ESNJ103A	CARBON	10K	1/4W	J	1
R674	E2HCPK331A	SOLID	330	1/2W	K	1
R901	R2HCPK681A	SOLID	680	1/2W	K	1
⚠ R902	R2HCPK100A	SOLID	10	1/2W	K	1
R903	R2HCTK153A	SOLID	15K	1/2W	K	1
R904	R2HCTK333A	SOLID	33K	1/2W	K	1
R905	R2HCTK223A	SOLID	22K	1/2W	K	1

DO NOT SCALE THIS DRAWING.

Figure 6-13. CRT Video Board Assembly (A10) Parts Location and Schematic Diagrams (Sheet 8 of 9).

PARTS LIST

Schematic Location	Parts No.	Description	Q'ty
TUBES & SEMICONDUCTORS			
D201	4 2021 10690	SI DIODE SIB01-02	1
D202	4 2021 07690	SI DIODE 1S2076A	1
D203	4 2021 07690	SI DIODE 1S2076A	1
D601	4 2020 03590	GE DIODE 1S188TV	1
D602	4 2020 03590	GE DIODE 1S188TV	1
⚠ D603	4 2021 10290	SI DIODE ERB24-04D	1
D604	4 2021 21270	SI DIODE U06C	1
or	4 2021 19470	SI DIODE U19C	1
D605	4 2021 10790	SI DIODE ERB24-02D	1
D606	4 2021 10790	SI DIODE ERB24-02D	1
D607	4 2021 21570	SI DI DFA01L	1
D671	4 2021 25170	ZE DIODE RD5.1EB2	1
IC501	4 2061 08670	IC-UPC1031H2	1
IC601	4 2061 71870	IC-HD74LS123	1
Q201	TG2SC536-----	SI TR 2SC536	1
or	TN2SC945----	SI TR 2SC945	1
Q202	TM2SC1360A---	SI TR 2SC1360A	1
⚠ Q551	TG2SD612--E--	SI TR 2SD612	1
⚠ or	TG2SD612--F--	SI TR 2SD612	1
Q601	TG2SC536-----	SI TR 2SC536	1
or	TN2SC945----	SI TR 2SC945	1
Q602	TG2SD400--E--	SI TR 2SD400	1
or	TG2SD400--F--	SI TR 2SD400	1
⚠ Q603	TN2SC2373---5	SI TR 2SC2373-5	1
Q604	TG2SC536-----	SI TR 2SC536	1
or	TN2SC945-----	SI TR 2SC945	1
TH501	4 2041 05770	THERMISTOR 52D26TS	1
⚠ V901	4 2129 00300	E2905B4-SDHT (Non Glare)	1
⚠ or	QTME2905B4--N	E2905B4-SD (Glare)	1

DO NOT SCALE THIS DRAWING.

Figure 6-13. CRT Video Board Assembly (A10) Parts Location and Schematic Diagrams (Sheet 9 of 9).

SIGNAL INTERFACE CONNECTOR PIN ASSIGNMENTS

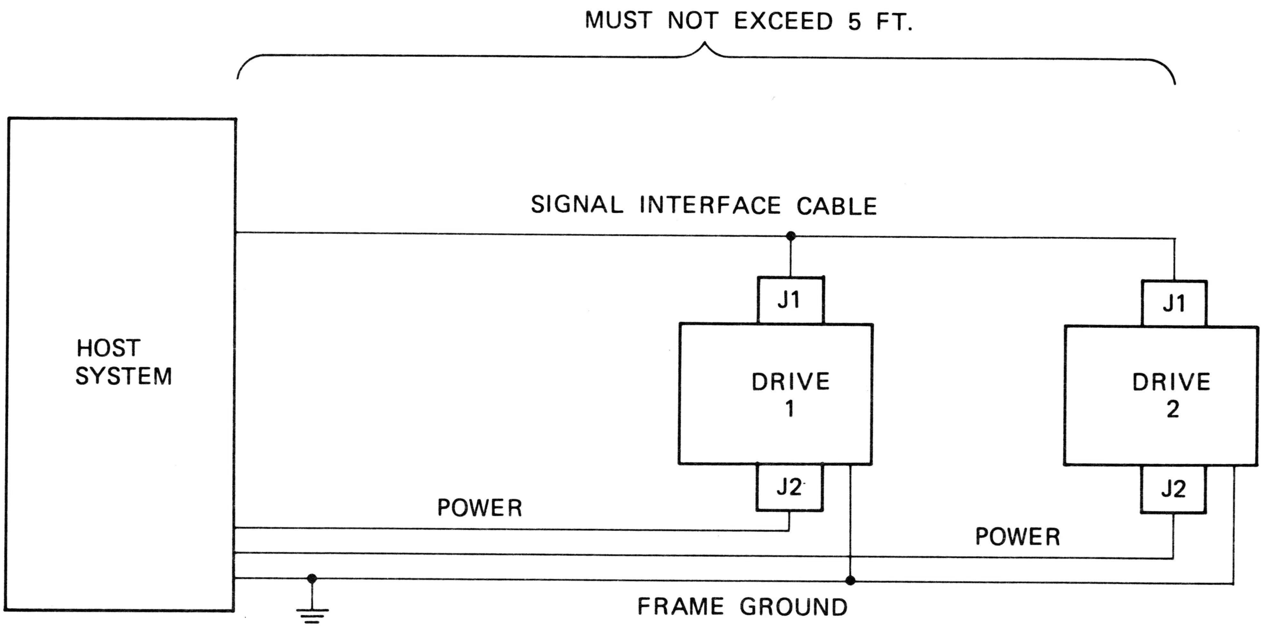
Pin No.	Description
1	RETURN
2	SELECT 0
3	RETURN
4	SELECT 1
5	RETURN
6	DIRTN
7	RETURN
8	STEP
9	RETURN
10	WRTDATA
11	RETURN
12	WRTGATE
13	RETURN
14	HDLOAD
15	RETURN
16	(RESERVED)
17	RETURN
18	INDEX
19	RETURN
20	TRK00
21	RETURN
22	WRTPRT
23	RETURN
24	RDDATA
25	RETURN
26	READY

Receptacle (26-pin)	(JAE PS-26SE0-D4P1-1C)
Receptacle (26-pin) for "daisy chain" application.	(JAE PS-26SE0-D4P1-1D)
Cable	3M 3365/26

DC POWER CONNECTOR PIN ASSIGNMENTS

Pin No.	Description
1	+5 V DC
2	GND (+5 V Return)
3	GND (+12 V Return)
4	+12 V DC

Receptacle (4-pin)	AMP 171822-4
Contact	AMP 170262-1
Wire	AWG 20 (or equivalent)


MUST NOT EXCEED 5 FT.
HOST SYSTEM
SIGNAL INTERFACE CABLE
J1
DRIVE 1
J2
J1
DRIVE 2
J2
POWER
POWER
FRAME GROUND

PHYSICAL INTERCONNECTION FOR DAISY CHAIN APPLICATION

Figure 6-14. Disk Drive (A11, A12) Parts Location and Wiring Diagrams (Sheet 1 of 16).

INTERFACE CHARACTERISTICS

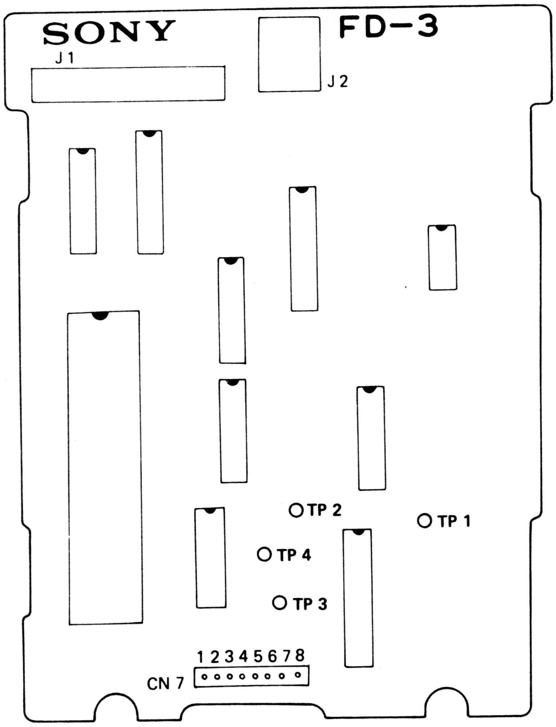
Input Signal Requirements

Logical Zero	0.0 V to +0.8 V
Logical One	+2.0 V to +5.25 V
Input Impedance	1000 ohms

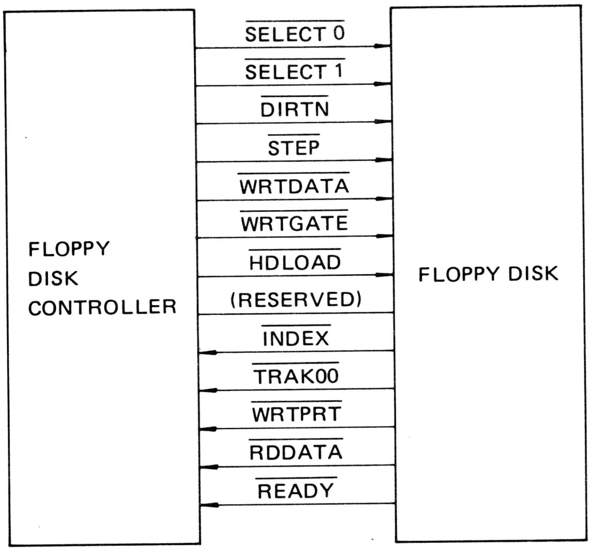
Output Signal Characteristics

True = Logical Zero	0.0 V to +0.4 V
Output Current	40 mA (max.)
False = Logical One	+2.4 V to +5.25 V
Output Current	250 µA (max.)

BOARD TEST POINTS LIST


SONY
FD-3
J1
J2
TP 2
TP 1
TP 4
TP 3
12345678
CN 7

SIGNAL INTERFACE DIAGRAM


FLOPPY DISK CONTROLLER
SELECT 0
SELECT 1
DIRTN
STEP
WRTDATA
WRTGATE
HDLOAD
(RESERVED)
INDEX
TRAK00
WRTPRT
RDDATA
READY
FLOPPY DISK

SIGNAL INTERFACE

DRIVE INPUT	MNEMONIC
DRIVE SELECT 0	SELECT 0
DRIVE SELECT 1	SELECT 1
DIRECTION SELECT	DIRTN
STEP	STEP
HEAD LOAD	HDLOAD
WRITE DATA	WRTDATA
WRITE GATE	WRTGATE

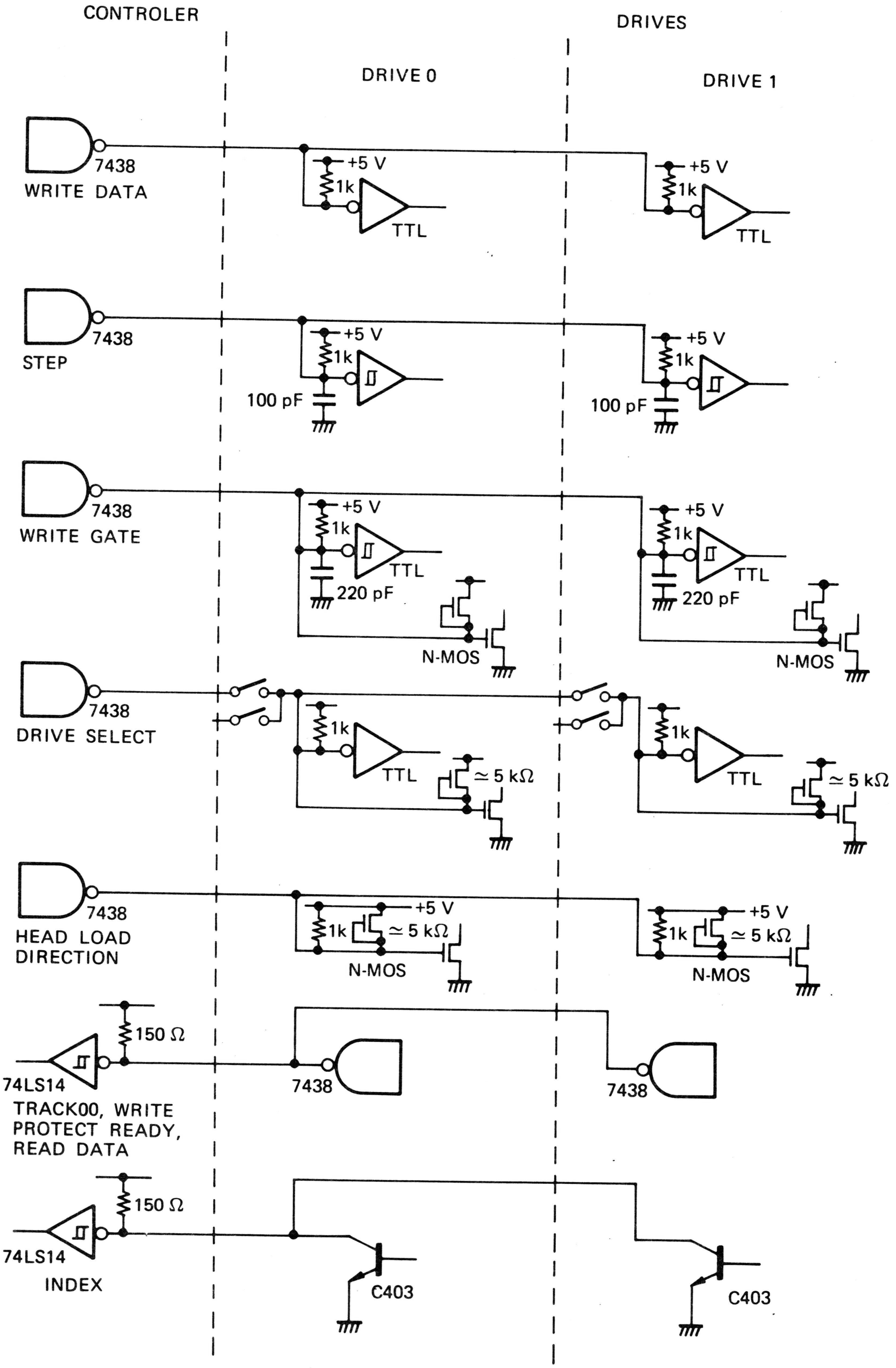
DRIVE OUTPUT	MNEMONIC
INDEX	INDEX
TRACK00	TRK00
WRITE PROTECT	WRTPRT
READY	READY
READ DATA	RDDATA

CN7-1	GND
CN7-2	N.C.
CN7-3	+ INDEX
CN7-4	CT-R0 (Output of the track 00 sensor)
CN7-5	N.C.
CN7-6	+ RD DATA
CN7-7	N.C.
CN7-8	AMP OUT

TP1	PRE AMP OUT (+)
TP2	PRE AMP OUT (–)
TP3	FILTER OUT (+)
TP4	FILTER OUT (–)

NOTE: Since OA-D30V employs differentiater at first step, all RF outputs of test points are differentiated.

Figure 6-14. Disk Drive (A11, A12) Parts Location and Wiring Diagrams (Sheet 2 of 16).


CONTROLER
DRIVES
DRIVE 0
DRIVE 1
7438
WRITE DATA
+5 V
1k
TTL
STEP
100 pF
WRITE GATE
220 pF
N-MOS
DRIVE SELECT
≃ 5 kΩ
HEAD LOAD
DIRECTION
150 Ω
74LS14
TRACK00, WRITE
PROTECT READY,
READ DATA
INDEX
C403

INTERFACE CIRCUITRY

Figure 6-14. Disk Drive (A11, A12) Parts Location and Wiring Diagrams (Sheet 3 of 16).

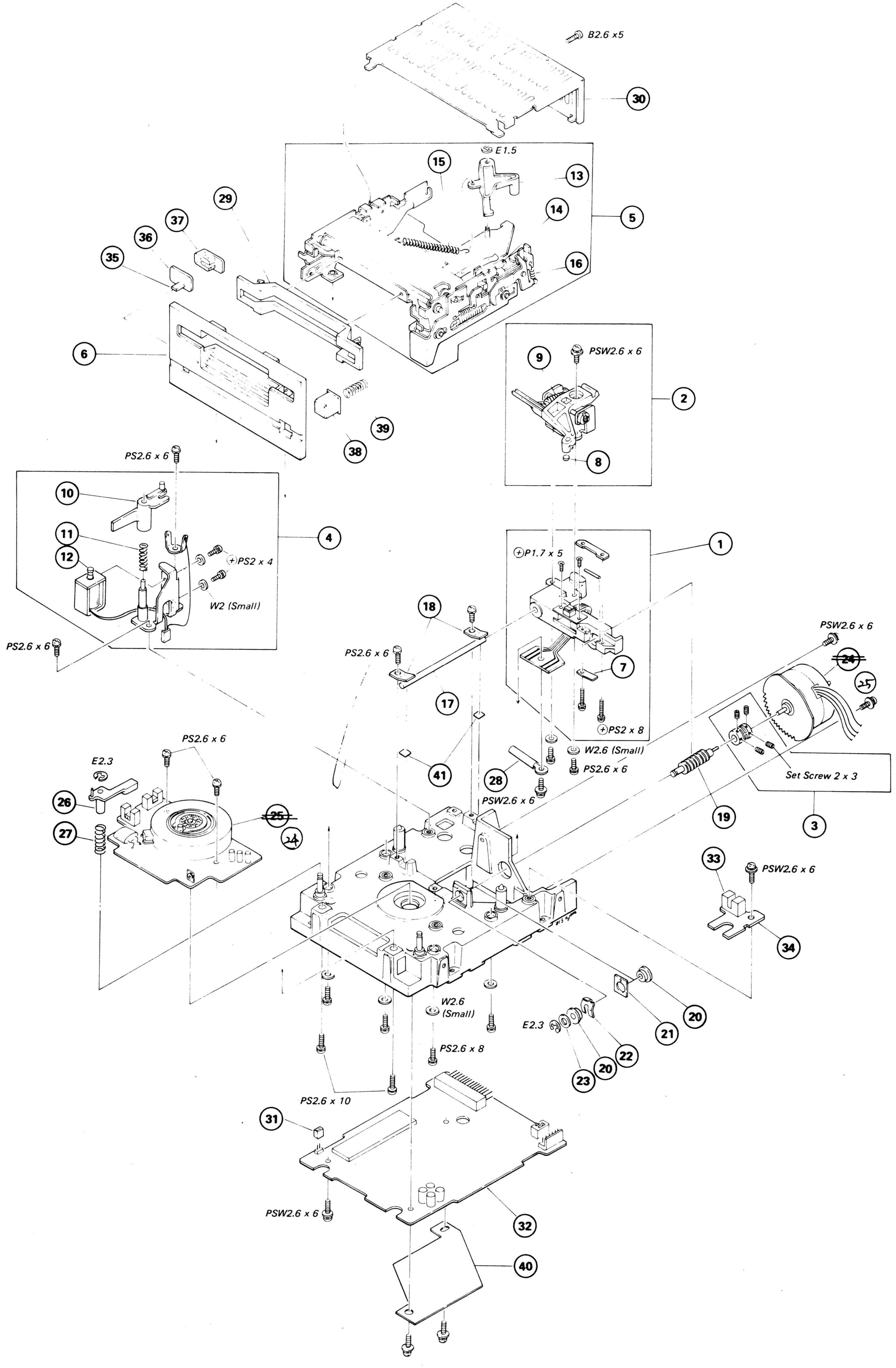

B2.6 x5
30
E1.5
15
13
14
5
29
37
36
35
16
6
9
PSW2.6 x 6
2
39
38
8
PS2.6 x 6
10
4
11
12
PS2 x 4
W2 (Small)
PS2.6 x 6
1
P1.7 x 5
18
PS2.6 x 6
PSW2.6 x 6
~~24~~
25
7
17
PS2 x 8
W2.6 (Small)
PS2.6 x 6
41
28
PSW2.6 x 6
Set Screw 2 x 3
19
3
E2.3
26
27
PS2.6 x 6
~~25~~
24
33
PSW2.6 x 6
34
20
21
W2.6 (Small)
E2.3
22
20
23
PS2.6 x 8
PS2.6 x 10
31
PSW2.6 x 6
32
40

Figure 6-14. Disk Drive (A11, A12) Parts Location and Wiring Diagrams (Sheet 4 of 16).

MECHANICAL PARTS LIST

NOTE: 1. Parts printed in **Bold-Face type** are normally stocked for replacement purposes. The remaining parts shown in this list are not normally required for routine service work.

2. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

No.	*Parts No.*	*Description*
1	———	Head Arm (Lower) Ass'y
2	**A-8010-063-A**	**Pad Arm Ass'y**
3	**A-8010-064-A**	**Coupling Ass'y**
4	**A-8010-065-A**	**Head Load Ass'y**
5	**A-8010-070-A**	**Cassette-Up Ass'y**
6	X-4601-007-0	Front Panel Ass'y
7	4-601-012-00	Spring
8	**4-601-013-00**	**Pad**
9	**3-583-500-00**	**Tension Spring**
10	4-601-017-00	HL Arm
11	4-601-060-00	Compression Spring
12	**1-454-289-00**	**Plunger Solenoid**
13	**4-601-042-00**	**Eject Arm**
14	———	E Lock Arm
15	3-537-783-99	Tension Spring
16	**4-847-057-00**	**Tension Spring**
17	4-601-003-00	Slide Guide Shaft
18	4-601-008-00	Guide Retainer
19	4-601-020-00	Lead Screw
20	**4-601-025-00**	**Ball Bearing (Flange)**
21	4-601-018-00	Spacer (A)
22	**4-601-011-00**	**Leaf Spring**
23	4-601-001-00	Spacer (B)
24	**8-838-024-01**	**Disk Drive DC Motor (BHF-2100A)**
25	**8-838-025-01**	**Stepping Motor (SNS-1100A)**
26	4-601-009-00	WP Arm
27	**3-659-609-00**	**Compression Spring**
28	3-701-822-00	Wire Holder
29	4-601-050-03	Blind Panel
30	4-601-026-00	Main Cover
31	1-561-724-00	Connector Socket
32	**A-8051-003-A**	**FD-3 Compl.**
33	**8-719-411-10**	**Diode (ON1110)**
34	1-605-399-00	Sensor PC Board
35	**8-719-900-92**	**Diode (GL9PR20)**
36	1-605-400-00	LED PC Board
37	4-601-027-00	Cushion
38	**4-601-052-00**	**Eject Button**
39	**4-601-060-00**	**Compression Spring**
40	———	Shield Plate
41	4-601-064-01	Adjustment Plate (t0.1)
	4-601-064-11	Adjustment Plate (t0.2)
	4-601-064-21	Adjustment Plate (t0.3)

Description	*Parts No.*
TOTSU PS2.6 x 4	7-621-972-05
TOTSU PS2.6 x 6	7-621-972-25
TOTSU PS2.6 x 8	7-621-972-35
TOTSU PS2.6 x 10	7-621-972-45
TOTSU PSW2.6 x 6	7-621-981-15
⊕ PS2 x 4	7-628-253-05
⊕ PS2 x 8	7-628-253-35
⊕ P1.7 x 5	7-627-552-58
TOTSU B2.6 x 5	7-621-912-20
Hexagon Set Screw (Flat) 2 x 3	7-621-732-08
W2 (small)	7-688-001-03
W2.6 (small)	7-688-002-01
E1.5	7-624-102-04
E2.3	7-624-105-04

Figure 6-14. Disk Drive (A11, A12) Parts Location and Wiring Diagrams (Sheet 5 of 16).

PC PARTS LAYOUT DRAWING

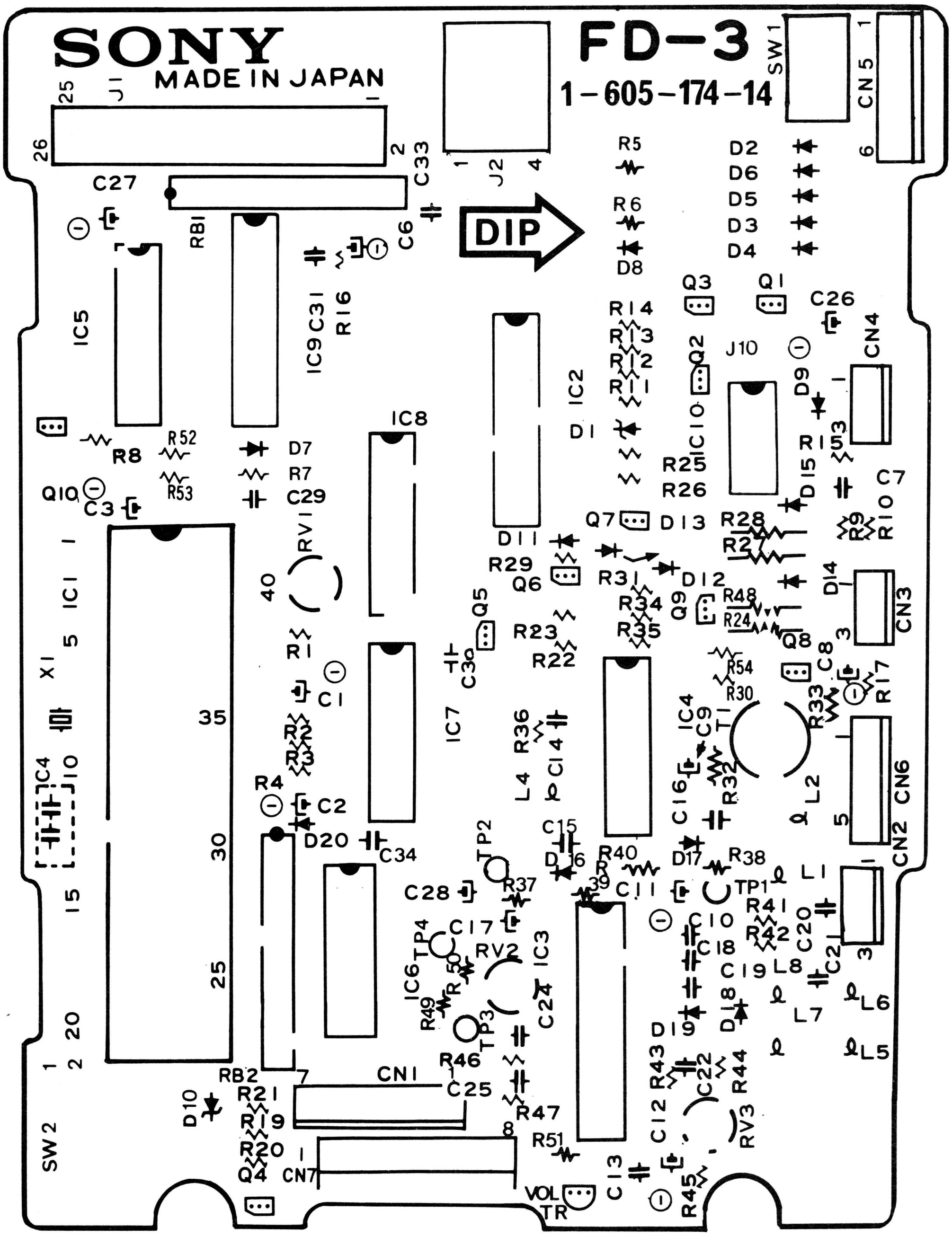
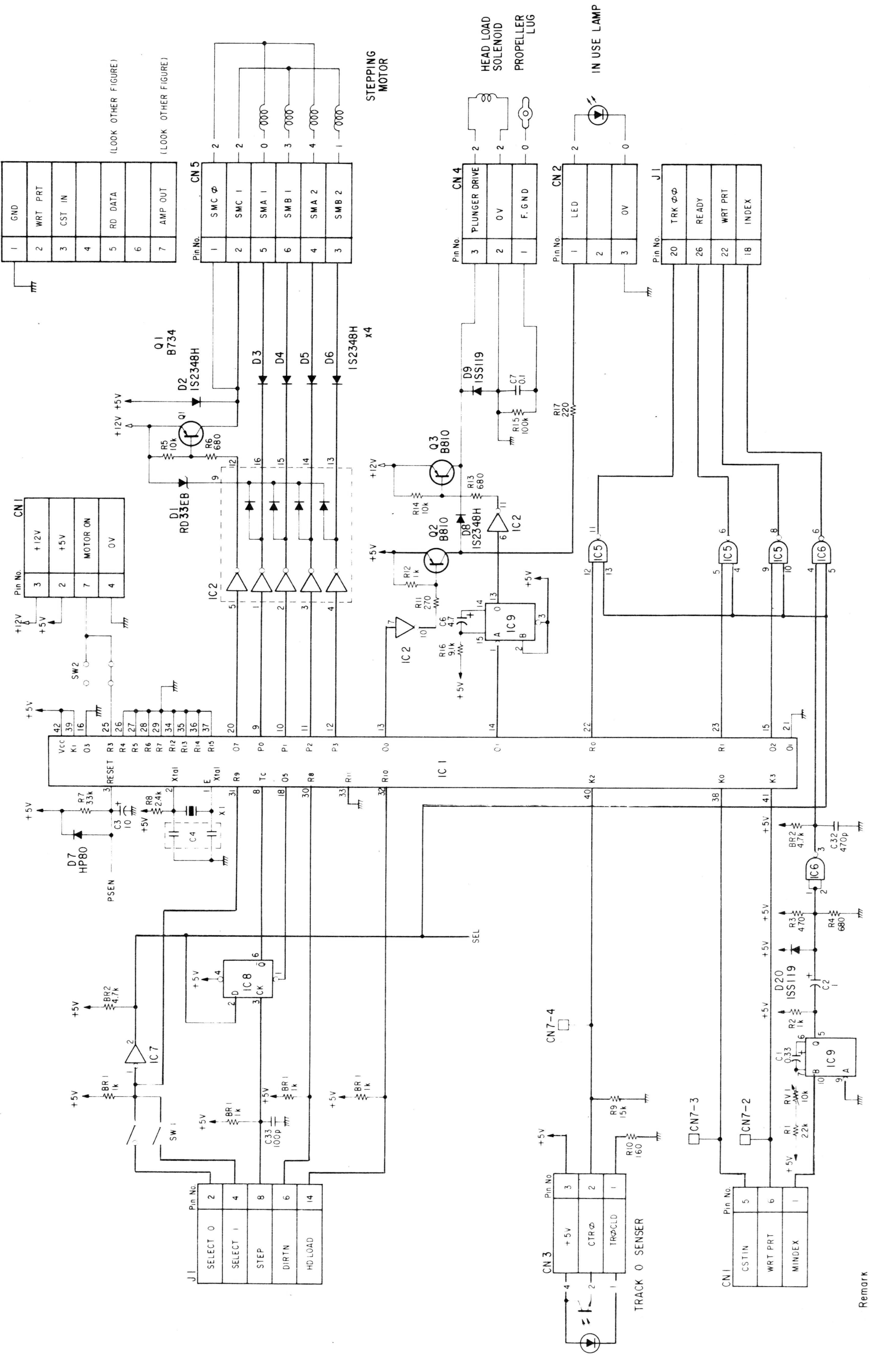

SONY
MADE IN JAPAN
FD-3
1-605-174-14
J1
25
26
1
2
C33
J2
1
4
SW1
CN5
1
6
C27
RB1
C6
DIP
R5
R6
D8
D2
D6
D5
D3
D4
IC5
IC9
C31
R16
Q3
Q1
C26
CN4
R14
R13
R12
R11
Q2
IC2
IC10
J10
D9
D1
R15
R13
D15
R25
R26
C7
R9
R10
R8
R52
R53
D7
R7
C29
IC8
Q10
C3
Q7
D13
R28
R27
D11
R29
Q6
R31
D12
D14
CN3
IC1
RV1
40
R34
R35
Q9
R48
R24
Q8
Q5
R23
R22
X1
R1
C1
C30
C8
R54
R30
R33
R17
35
R2
R3
IC7
R36
C14
IC4
C9
T1
C4
J10
R4
C2
L4
C16
R32
L2
CN6
CN2
30
D20
C34
TP2
C15
D16
R40
R39
D17
R38
L1
C28
R37
C11
TP1
R41
15
C17
TP4
C10
R42
C20
C21
IC6
R50
RV2
IC3
C18
C19
L8
25
R49
TP3
C24
D18
D19
L7
L6
20
R46
R43
C22
R44
L5
1
2
RB2
CN1
C25
7
R47
D10
R21
R19
C12
RV3
SW2
R20
8
R51
Q4
CN7
C13
R45
VOL
TR

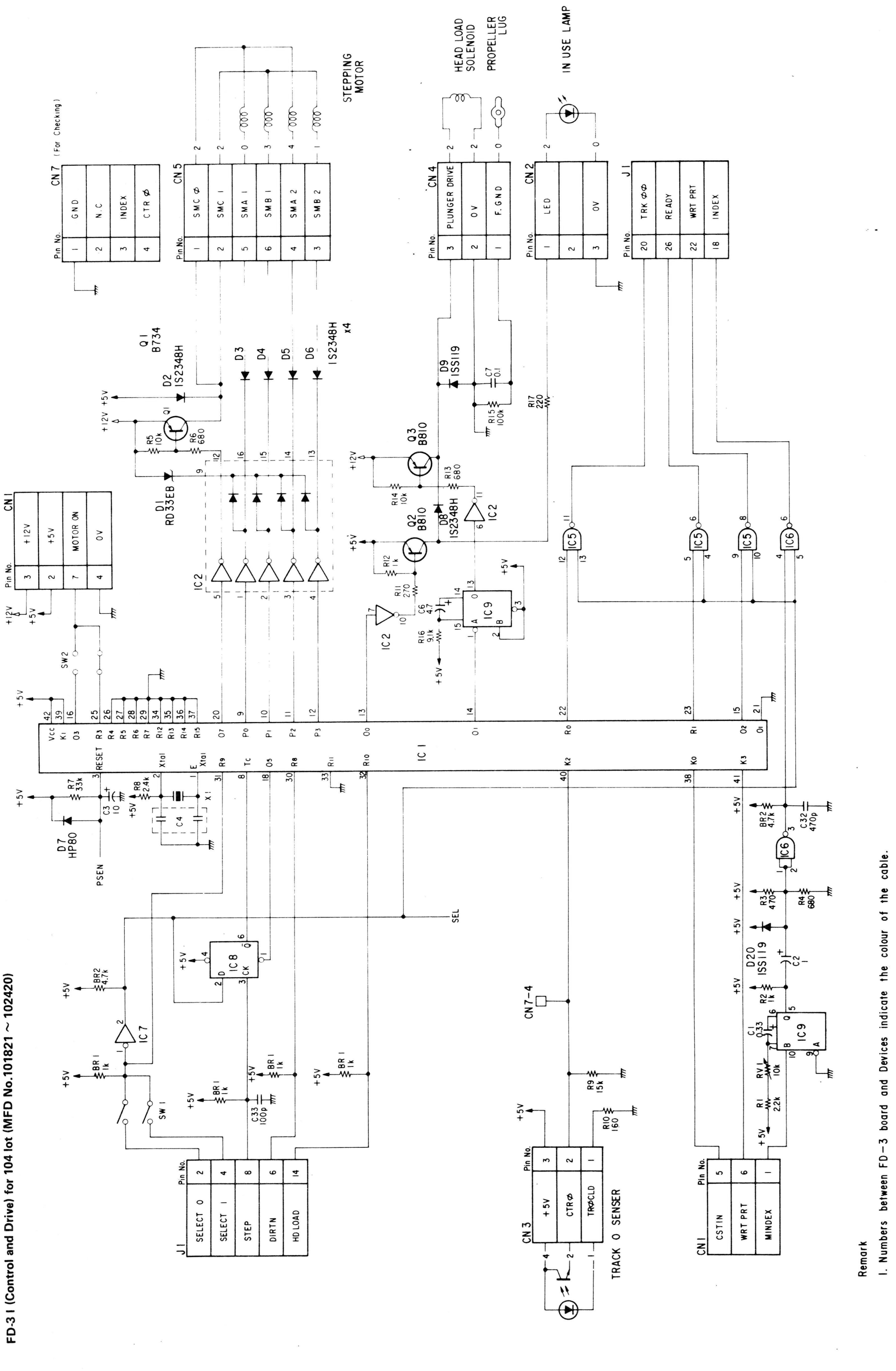
Figure 6-14. Disk Drive (A11, A12) Parts Location and Wiring Diagrams (Sheet 6 of 16).

FD-31 (Control and Drive) for 102, 103 lot Serial No.10081 ~ 10680 (MFD No.100221 ~ 101820)


CN7
GND
WRT PRT
CST IN
RD DATA
AMP OUT
(LOOK OTHER FIGURE)
CN 5
SMC Φ
SMC 1
SMA 1
SMB 1
SMA 2
SMB 2
STEPPING MOTOR
CN 4
PLUNGER DRIVE
OV
F.GND
HEAD LOAD SOLENOID
PROPELLER LUG
CN 2
LED
IN USE LAMP
J1
TRK ΦΦ
READY
INDEX
Q1 B734
D2 1S2348H
D3
D4
D5
D6
1S2348H x4
D9 1SS119
C7 0.1
R15 100k
R17 220
Q3 B810
Q2 B810
R13 680
R14 10k
D8 1S2348H
R12 1k
R11 270
C6 47
R16 9.1k
IC9
IC2
IC5
IC6
CN1
+12V
+5V
MOTOR ON
D1 RD33EB
R5 10k
R6 680
SW2
IC 1
R7 33k
R8 2.4k
C3 10
C4
D7 HP80
PSEN
SEL
BR2 4.7k
C32 470p
R3 470
R4 680
D20 1SS119
C2 1
R2 1k
C1 0.33
RV1 10k
R1 22k
IC8
IC7
BR1 1k
SW1
C33 100p
SELECT 0
SELECT 1
STEP
DIRTN
HD LOAD
CN7-4
CN7-3
CN7-2
CN 3
CTRΦ
TRΦCLD
R9 15k
R10 160
TRACK 0 SENSER
CSTIN
MINDEX
Pin No.

Remark
1. Numbers between FD-3 board and Devices indicate the colour of the cable.

Figure 6-14. Disk Drive (A11, A12) Parts Location and Wiring Diagrams (Sheet 7 of 16).


FD-31 (Control and Drive) for 104 lot (MFD No.101821 ~ 102420)

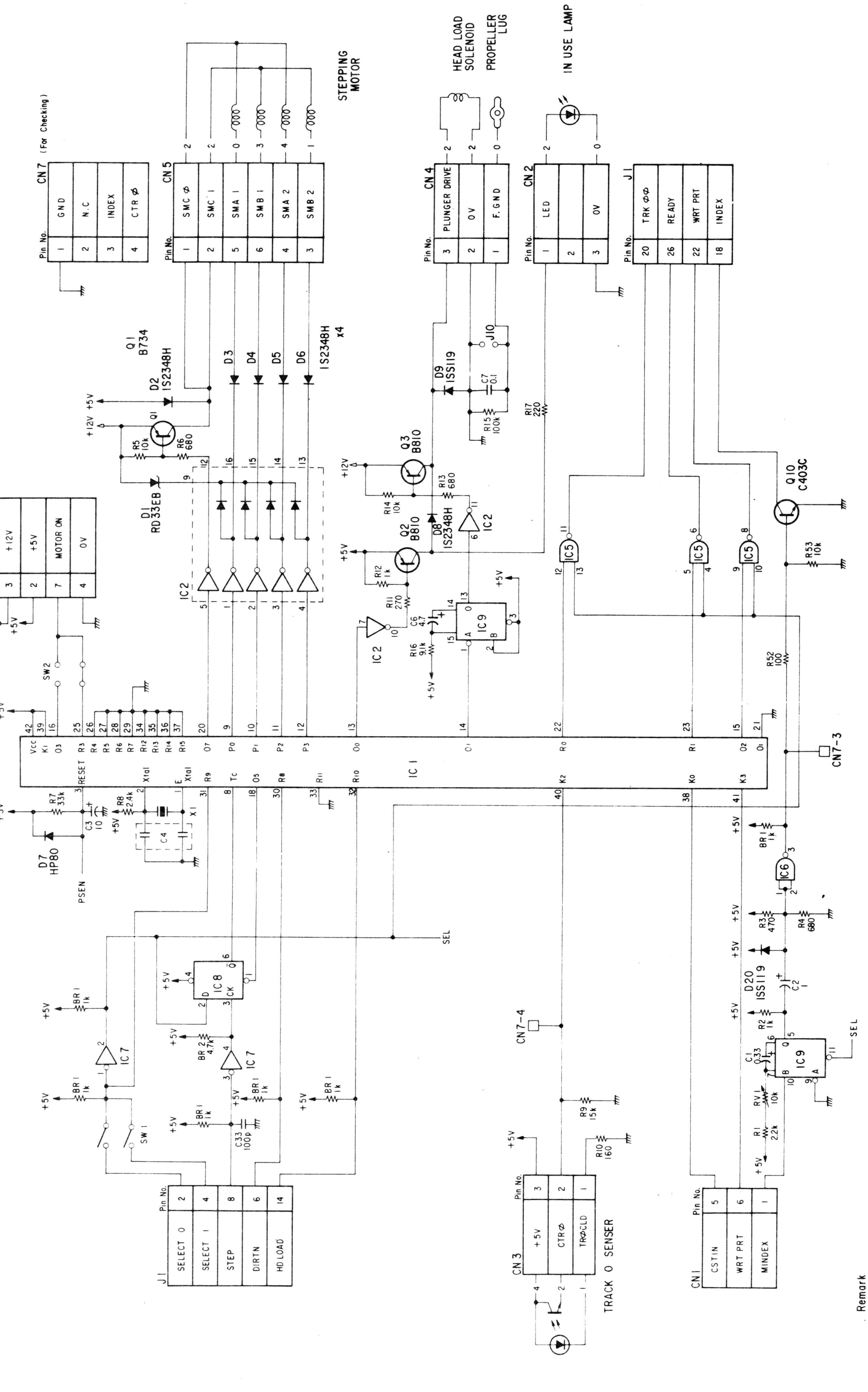
CN7 (For Checking)
Pin No.
1 GND
2 N.C
3 INDEX
4 CTR Ø
CN5
1 SMC Ø
2 SMC 1
5 SMA 1
6 SMB 1
4 SMA 2
3 SMB 2
STEPPING MOTOR
CN4
3 PLUNGER DRIVE
2 0V
1 F.GND
HEAD LOAD SOLENOID
PROPELLER LUG
CN2
1 LED
2
3 0V
IN USE LAMP
J1
20 TRK ØØ
26 READY
22 WRT PRT
18 INDEX
CN1
3 +12V
2 +5V
7 MOTOR ON
4 0V
Q1 B734
D2 1S2348H
D3 D4 D5 D6 1S2348H x4
D1 RD33EB
R5 10k
R6 680
IC2
Q3 B810
Q2 B810
R13 680
R14 10k
D8 1S2348H
D9 1SS119
C7 0.1
R15 100k
R17 220
R12 1k
R11 270
C6 47
R16 9.1k
IC9
IC5
IC6
SW2
IC 1
Vcc K1 O3 R3 R4 R5 R6 R7 R12 R13 R14 R15 O7 P0 P1 P2 P3 O0 O1 R0 R1 O2 O1
RESET Xtal Xtal R9 Tc O5 R8 R11 R10 K2 K0 K3
R7 33k
C3 10
R8 2.4k
C4
X1
D7 HP80
PSEN
SEL
BR2 4.7k
IC7
IC8
BR1 1k
SW1
C33 100p
J1
2 SELECT 0
4 SELECT 1
8 STEP
6 DIRTN
14 HD LOAD
CN7-4
R9 15k
R10 160
CN3
3 +5V
2 CTRØ
1 TRØCLD
TRACK 0 SENSER
C32 470p
R3 470
R4 680
D20 1SS119
C2 1
R2 1k
C1 0.33
RV1 10k
R1 2.2k
CN1
5 CSTIN
6 WRT PRT
1 MINDEX
+5V
+12V

Remark
1. Numbers between FD-3 board and Devices indicate the colour of the cable.

Figure 6-14. Disk Drive (A11, A12) Parts Location and Wiring Diagrams (Sheet 8 of 16).

`

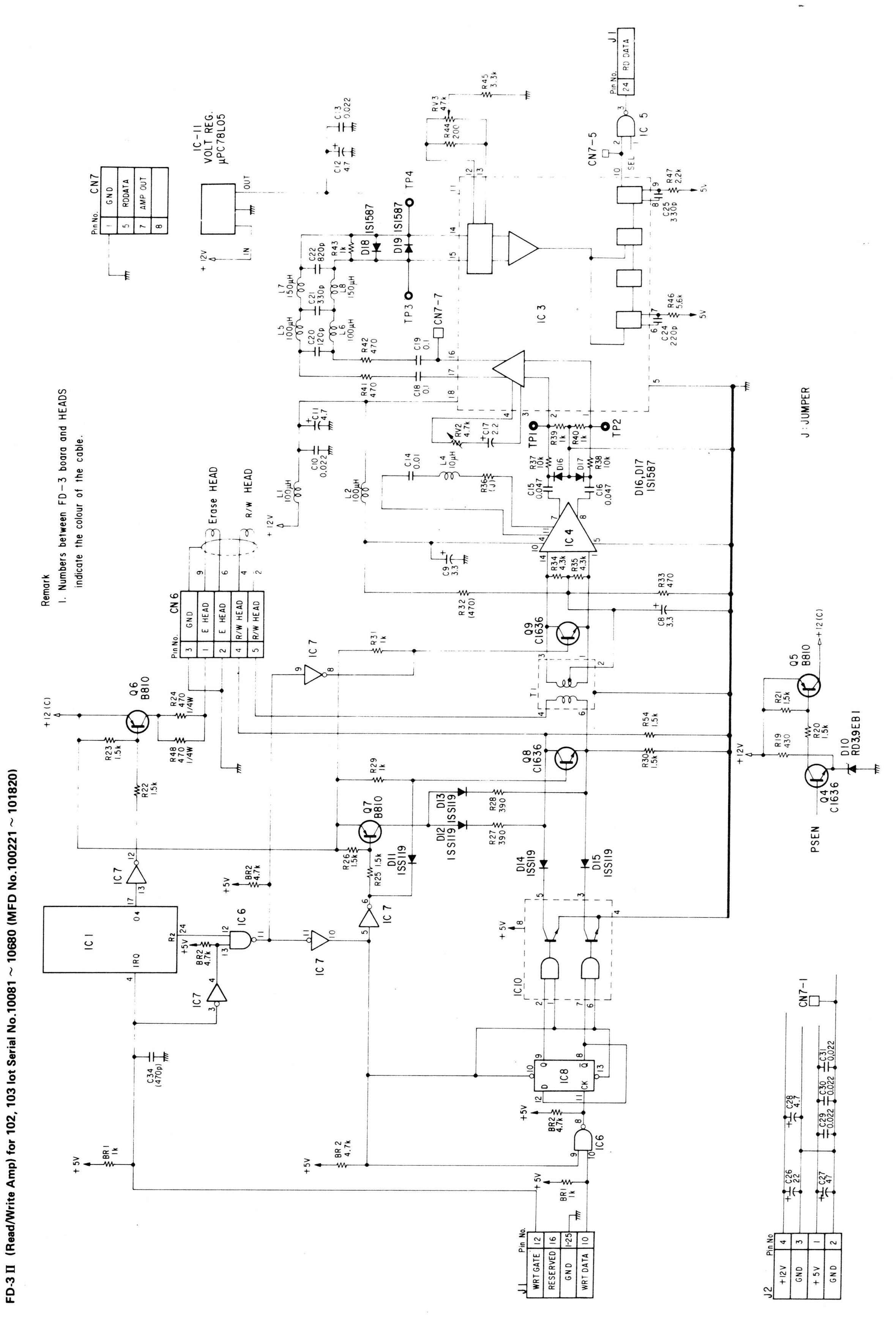
FD-3 I (Control and Drive) for 105 ~ 111 lot Serial No.10681 ~ 17880 (MFD No.102421 ~ 110220)



CN 7 (For Checking)
Pin No.
GND
N.C
INDEX
CTR Ø
CN 5
SMC Ø
SMC 1
SMA 1
SMB 1
SMA 2
SMB 2
STEPPING MOTOR
CN 4
PLUNGER DRIVE
0V
F.GND
HEAD LOAD SOLENOID
PROPELLER LUG
CN 2
LED
IN USE LAMP
J 1
TRK ØØ
READY
WRT PRT
INDEX
CN 1
+12V
+5V
MOTOR ON
0V
Q1 B734
D2 1S2348H
D3
D4
D5
D6
1S2348H x4
D1 RD33EB
R5 10k
R6 680
IC2
Q3 B810
Q2 B810
D8 1S2348H
D9 1SS119
C7 0.1
J10
R15 100k
R17 220
R13 680
R14 10k
R12 1k
R11 270
C6 4.7
R16 9.1k
IC9
IC5
Q10 C403C
R53 10k
R52 100
SW 2
IC 1
Vcc K1 O3 R3 R4 R5 R6 R7 R12 R13 R14 R15 O7 P0 P1 P2 P3 O0 O1 R0 R1 O2 O1
RESET Xtal Xtal R9 Tc O5 R8 R11 R10 K2 K0 K3
CN7-3
R7 33k
R8 2.4k
C3 10
C4
X1
D7 HP80
PSEN
SEL
IC8
IC7
BR1 1k
BR2 4.7k
SW 1
C33 100p
J1
SELECT 0
SELECT 1
STEP
DIRTN
HD LOAD
CN7-4
R9 15k
R10 160
CN 3
+5V
CTRØ
TRØCLD
TRACK 0 SENSER
IC6
R3 470
R4 680
D20 1SS119
C2 1
R2 1k
C1 0.33
RV1 10k
R1 22k
CN1
CSTIN
WRT PRT
MINDEX

Remark
1. Numbers between FD-3 board and Devices indicate the colour of the cable.

Figure 6-14. Disk Drive (A11, A12) Parts Location and Wiring Diagrams (Sheet 9 of 16).

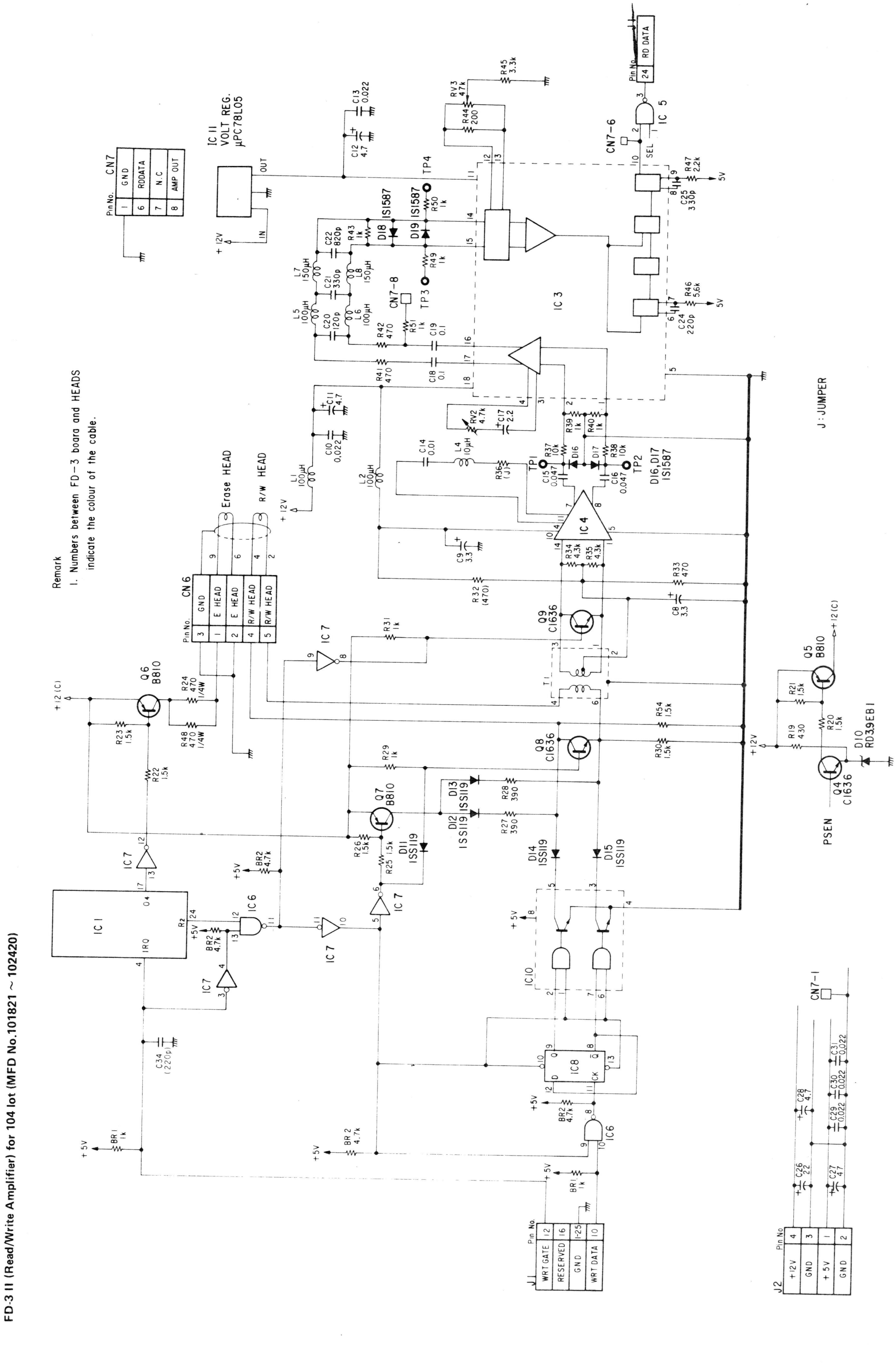


FD-3 II (Read/Write Amp) for 102, 103 lot Serial No.10081 ~ 10680 (MFD No.100221 ~ 101820)

Remark
1. Numbers between FD-3 board and HEADS indicate the colour of the cable.

CN7
GND
RDDATA
AMP OUT
IC-11 VOLT REG. μPC78L05
IN
OUT
+12V
TP3
TP4
CN7-7
CN7-5
IC 3
IC 4
IC 5
IC 1
IRQ
IC 6
IC 7
IC 8
IC10
CN 6
E HEAD
R/W HEAD
Erase HEAD
R/W HEAD
Q5 B810
Q6 B810
Q7 B810
Q8 C1636
Q9 C1636
Q4 C1636
D10 RD39EB1
D11 ISS119
D12 ISS119
D13 ISS119
D14 ISS119
D15 ISS119
D16, D17 IS1587
D18 IS1587
D19 IS1587
TP1
TP2
T1
RV2 4.7k
RV3 47k
PSEN
J: JUMPER
J1
WRT GATE
RESERVED
GND
WRT DATA
RD DATA
J2
+12V
GND
+5V
GND
CN7-1
+5V
+12(C)

Figure 6-14. Disk Drive (A11, A12) Parts Location and Wiring Diagrams (Sheet 10 of 16).


FD-3 II (Read/Write Amplifier) for 104 lot (MFD No.101821 ~ 102420)

Remark

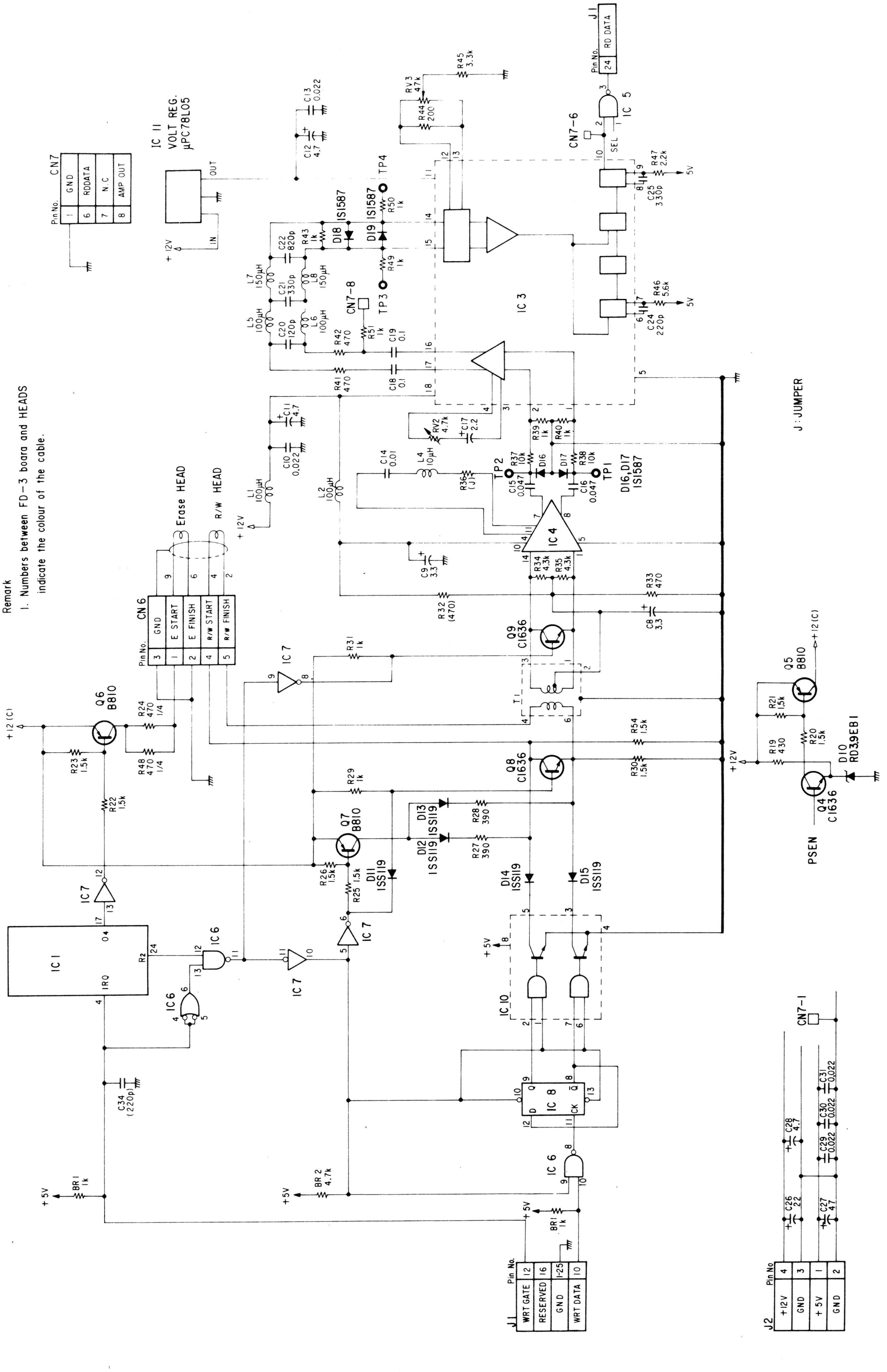
1. Numbers between FD-3 board and HEADS indicate the colour of the cable.

J : JUMPER

CN7
Pin No. 1 GND
6 RDDATA
7 N.C
8 AMP OUT
IC 11 VOLT REG. μPC78L05
IN
OUT
+12V
C12 4.7
C13 0.022
CN6
Pin No. 3 GND
1 E HEAD
2 E HEAD
4 R/W HEAD
5 R/W HEAD
Erase HEAD
R/W HEAD
L1 100μH
L2 100μH
C10 0.022
C11 4.7
L5 100μH
L6 100μH
L7 150μH
L8 150μH
C20 120p
C21 330p
C22 820p
R41 470
R42 470
R43 1k
R44 200
R45 3.3k
RV3 47k
D18 IS1587
D19 IS1587
R49 1k
R50 1k
TP3
TP4
CN7-8
R51 1k
C18 0.1
C19 0.1
IC 3
CN7-6
SEL
IC 5
Pin No. 24 RD DATA
C24 220p
C25 330p
R46 5.6k
R47 2.2k
5V
RV2 4.7k
C17 2.2
C14 0.01
L4 10μH
R36 (J)
TP1
TP2
C15 0.047
C16 0.047
D16 D17
R37 10k
R38 10k
R39 1k
R40 1k
D16, D17 IS1587
IC 4
R34 4.3k
R35 4.3k
C9 3.3
R32 (470)
R33 470
C8 3.3
Q9 C1636
R31 1k
IC 7
T1
R54 1.5k
Q8 C1636
R30 1.5k
R29 1k
Q5 B810
+12(C)
R21 1.5k
R19 430
R20 1.5k
D10 RD3.9EB1
Q4 C1636
PSEN
Q6 B810
+12(C)
R24 470 1/4W
R48 470 1/4W
R23 1.5k
R22 1.5k
Q7 B810
R28 390
R27 390
D13 ISS119
D12 ISS119
D11 ISS119
D14 ISS119
D15 ISS119
R26 1.5k
R25 1.5k
BR2 4.7k
IC 1
IRQ
Rz
IC 6
IC 10
IC 8
D Q CK Q̄
C34 (220p)
BR1 1k
+5V
J1
Pin No. 12 WRT GATE
16 RESERVED
1-25 GND
10 WRT DATA
J2
Pin No. 4 +12V
3 GND
1 +5V
2 GND
C26 22
C27 47
C28 4.7
C29 0.022
C30 0.022
C31 0.022
CN7-1

Figure 6-14. Disk Drive (A11, A12) Parts Location and Wiring Diagrams (Sheet 11 of 16).

FD-3 II (Read/Write Amplifier) for 105 ~ 111 lot Serial No.10681 ~ 17880 (MFD No.102421 ~ 110220)


IC 1
IRQ
Q4
R2
IC 6
IC 7
IC 8
IC 10
IC 3
IC 4
IC 5
IC 11
VOLT REG.
μPC78L05
IN
OUT
Q4 C1636
Q5 B810
Q6 B810
Q7 B810
Q8 C1636
Q9 C1636
D10 RD39EB1
D11 1SS119
D12 1SS119
D13 1SS119
D14 1SS119
D15 1SS119
D16, D17 1S1587
D18 1S1587
D19 1S1587
T1
TP1
TP2
TP3
TP4
RV2 4.7k
RV3 47k
L1 100μH
L2 100μH
L4 10μH
L5 100μH
L6 100μH
L7 150μH
L8 150μH
C8 3.3
C9 3.3
C10 0.022
C11 4.7
C12 4.7
C13 0.022
C14 0.01
C15 0.047
C16 0.047
C17 2.2
C18 0.1
C19 0.1
C20 120p
C21 330p
C22 820p
C24 220p
C25 330p
C26 22
C27 47
C28 4.7
C29 0.022
C30 0.022
C31 0.022
C34 (220p)
R19 430
R20 1.5k
R21 1.5k
R22 1.5k
R23 1.5k
R24 470 1/4
R25 1.5k
R26 1.5k
R27 390
R28 390
R29 1k
R30 1.5k
R31 1k
R32 (470)
R33 470
R34 4.3k
R35 4.3k
R36 (J)
R37 10k
R38 10k
R39 1k
R40 1k
R41 470
R42 470
R43 1k
R44 200
R45 3.3k
R46 5.6k
R47 2.2k
R48 470 1/4
R49 1k
R50 1k
R51 1k
R54 1.5k
BR1 1k
BR2 4.7k
+12(C)
+12V
+5V
5V
SEL
PSEN
J: JUMPER
Erase HEAD
R/W HEAD
CN6
Pin No. | 3 GND | 1 E START | 2 E FINISH | 4 R/W START | 5 R/W FINISH
CN7
Pin No. | 1 GND | 6 RDDATA | 7 N.C | 8 AMP OUT
CN7-1
CN7-6
CN7-8
J1
Pin No. | 12 WRT GATE | 16 RESERVED | 1-25 GND | 10 WRT DATA
J1
Pin No. | 24 RD DATA
J2
Pin No. | 4 +12V | 3 GND | 1 +5V | 2 GND

Remark

1. Numbers between FD-3 board and HEADS indicate the colour of the cable.

Figure 6-14. Disk Drive (A11, A12) Parts Location and Wiring Diagrams (Sheet 12 of 16).

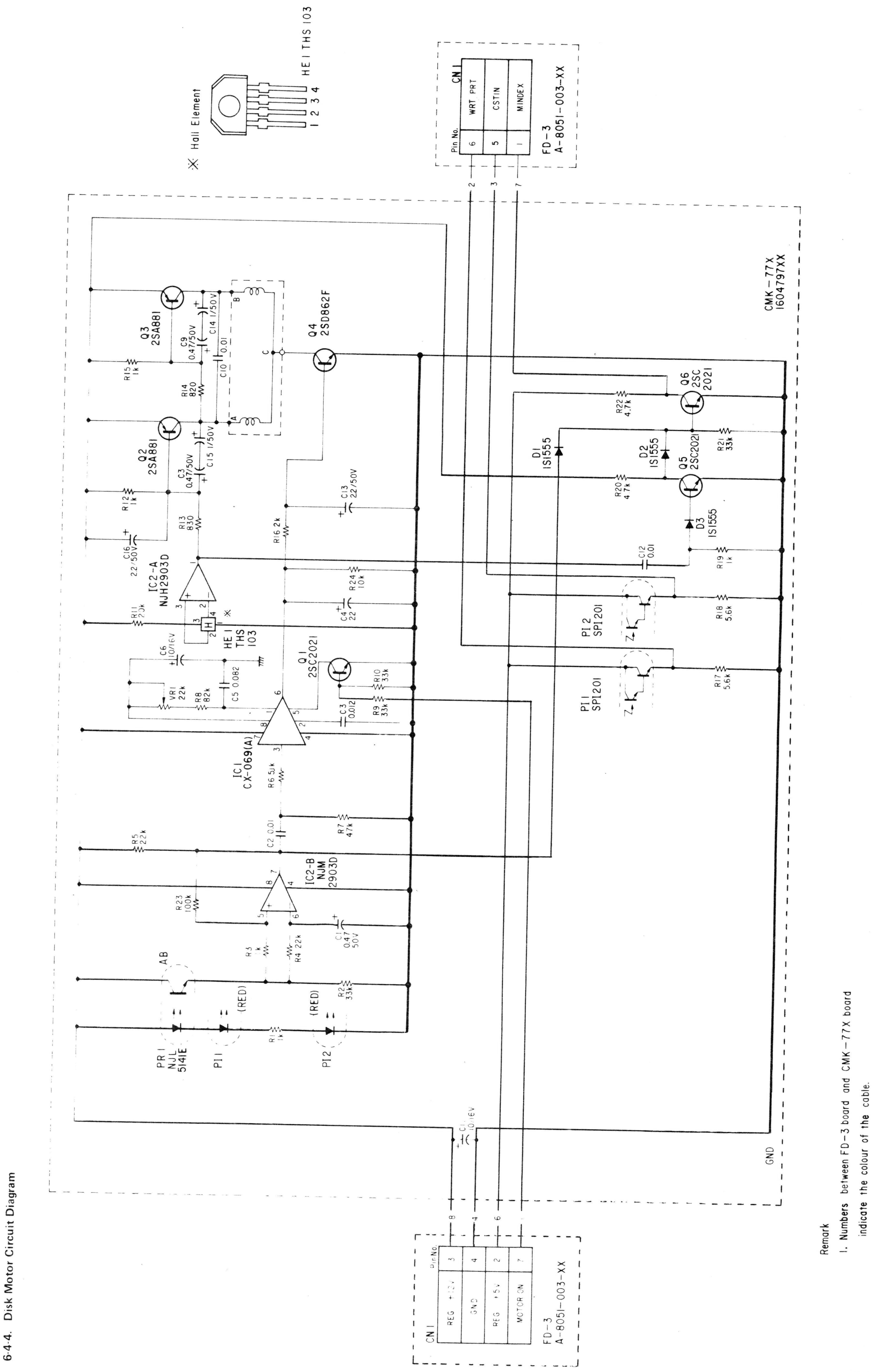
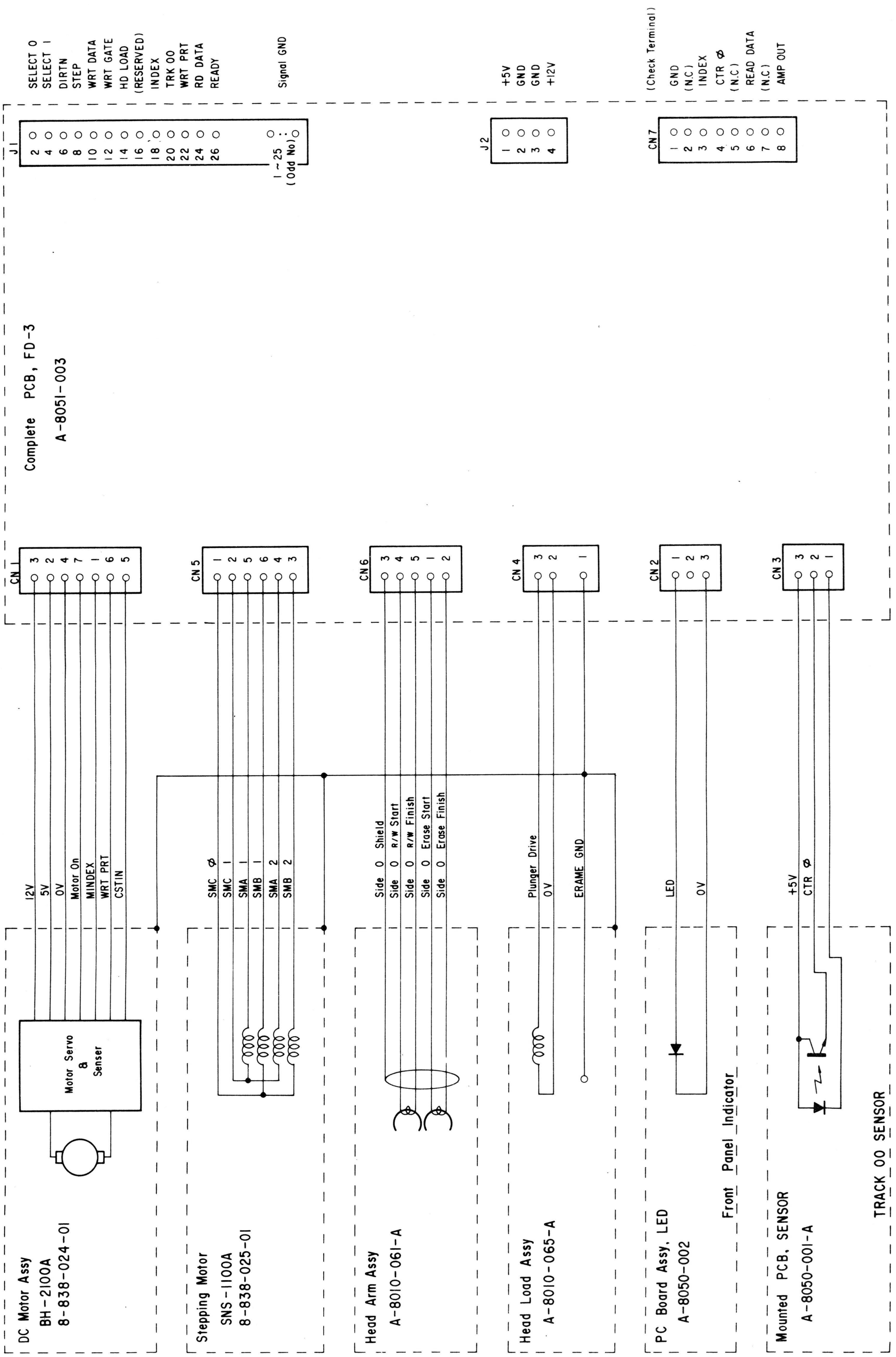

6-4-4. Disk Motor Circuit Diagram
※ Hall Element
1 2 3 4
HEI THS 103
CN1
Pin No.
6 WRT PRT
5 CSTIN
1 MINDEX
FD-3
A-8051-003-XX
CMK-77X
1604797XX
Q3 2SA881
Q2 2SA881
Q4 2SD862F
Q6 2SC2021
Q5 2SC2021
Q1 2SC2021
D1 1S1555
D2 1S1555
D3 1S1555
IC2-A NJH2903D
IC2-B NJM 2903D
IC1 CX-069(A)
HE1 THS 103
PI2 SPI201
PI1 SPI201
PR1 NJL 5141E
AB
(RED)
(RED)
PI1
PI2
R15 1k
R14 820
R12 1k
R13 830
R11 20k
R16 2k
R24 10k
R10 33k
R9 33k
R8 82k
VR1 22k
R6 5.1k
R5 22k
R7 47k
R23 100k
R3 k
R4 22k
R2 33k
R1 1k
R22 4.7k
R21 33k
R20 4.7k
R19 1k
R18 5.6k
R17 5.6k
C9 0.47/50V
C14 1/50V
C10 0.01
C3 0.47/50V
C15 1/50V
C13 22/50V
C16 22/50V
C4 22
C6 10/16V
C5 0.082
C3 0.012
C2 0.01
C1 0.47 50V
C12 0.01
C1 10/16V
A
B
C
GND
CN1
Pin No.
3 REG +12V
4 GND
2 REG +5V
7 MOTOR ON
FD-3
A-8051-003-XX
Remark
1. Numbers between FD-3 board and CMK-77X board indicate the colour of the cable.

Figure 6-14. Disk Drive (A11, A12) Parts Location and Wiring Diagrams (Sheet 13 of 16).

Interconnection Diagram 105 lot Serial No.10681 ~ (MFD No.102421 ~)

NOTICE: CN7 pin assignment of old type PCB (Serial No. ~ 10680) is different from this diagram. See circuit diagram.



Complete PCB, FD-3
A-8051-003
J1
2 SELECT 0
4 SELECT 1
6 DIRTN
8 STEP
10 WRT DATA
12 WRT GATE
14 HD LOAD
16 (RESERVED)
18 INDEX
20 TRK 00
22 WRT PRT
24 RD DATA
26 READY
1 ~ 25 (Odd No) Signal GND
J2
1 +5V
2 GND
3 GND
4 +12V
CN7 (Check Terminal)
1 GND
2 (N.C)
3 INDEX
4 CTR Ø
5 (N.C)
6 READ DATA
7 (N.C)
8 AMP OUT
CN1
3 2 4 7 1 6 5
CN5
1 2 5 6 4 3
CN6
3 4 5 1 2
CN4
3 2 1
CN2
1 2 3
CN3
3 2 1
12V
5V
0V
Motor On
MINDEX
WRT PRT
CSTIN
SMC Ø
SMC 1
SMA 1
SMB 1
SMA 2
SMB 2
Side 0 Shield
Side 0 R/W Start
Side 0 R/W Finish
Side 0 Erase Start
Side 0 Erase Finish
Plunger Drive
0V
ERAME GND
LED
0V
+5V
CTR Ø
Motor Servo & Senser
DC Motor Assy
BH-2100A
8-838-024-01
Stepping Motor
SNS-1100A
8-838-025-01
Head Arm Assy
A-8010-061-A
Head Load Assy
A-8010-065-A
PC Board Assy, LED
A-8050-002
Front Panel Indicator
Mounted PCB, SENSOR
A-8050-001-A
TRACK 00 SENSOR

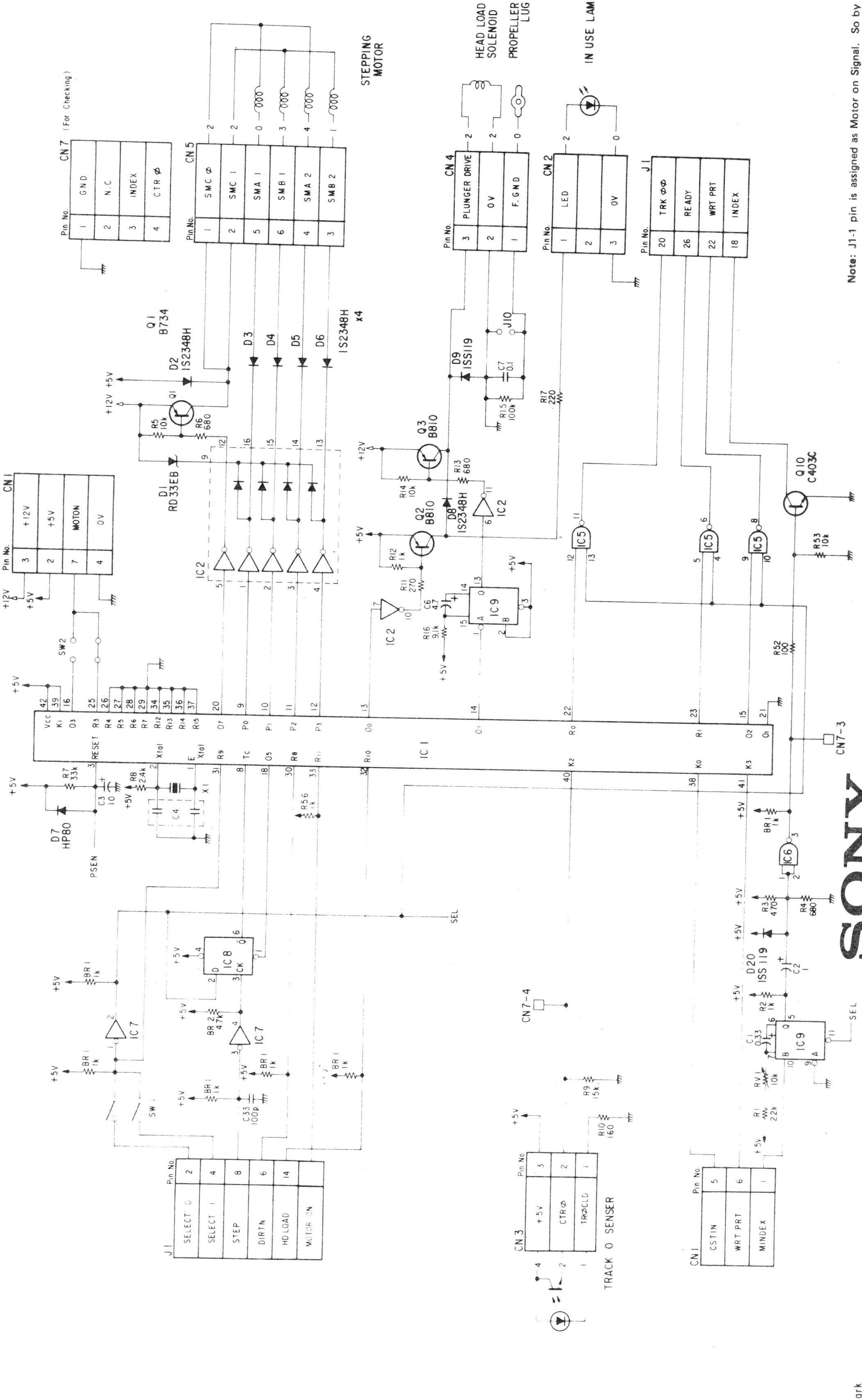
Figure 6-14. Disk Drive (A11, A12) Parts Location and Wiring Diagrams (Sheet 14 of 16).

SUPPLEMENT 1

FD-3I (Control and Drive) for 112 lot and Higher Serial No.17881 and Higher (MFD No.110221 and Higher)

Changed Points

1) Power Sense Circuit
2) Motor on Control Signal is added.
   Interface circuit for the old type (non Motor on Control) Drive is compatible with new type (Motor on Controlable) Drive.



CN 7 (For Checking)
GND
N.C
INDEX
CTR ø
CN 5
SMC ø
SMC 1
SMA 1
SMB 1
SMA 2
SMB 2
STEPPING MOTOR
CN 4
PLUNGER DRIVE
0V
F.GND
HEAD LOAD SOLENOID
PROPELLER LUG
CN 2
LED
0V
IN USE LAMP
J1
TRK øø
READY
WRT PRT
INDEX
CN1
+12V
+5V
MOTON
0V
Q1 B734
D2 1S2348H
D3
D4
D5
D6
1S2348H x4
D1 RD33EB
IC2
Q2 B810
Q3 B810
D8 1S2348H
D9 1SS119
J10
Q10 C403C
IC1
IC5
IC6
IC7
IC8
IC9
D7 HP80
PSEN
SW2
SW
SEL
CN7-3
CN7-4
D20 1SS119
SONY
J1
SELECT 0
SELECT 1
STEP
DIRTN
HD LOAD
MOTOR ON
CN 3
+5V
CTRø
TRøCLD
TRACK 0 SENSER
CN1
CSTIN
WRT PRT
MINDEX

Note: J1-1 pin is assigned as Motor on Signal. So by using J1-1 pin, you can control the Motor on/off. If J1-1 pin is connected to GND, the Drive operates as the previous function.

Remark
1. Numbers between FD-3 board and Devices indicate the colour of the cable.

Figure 6-14. Disk Drive (A11, A12) Parts Location and Wiring Diagrams (Sheet 15 of 16).

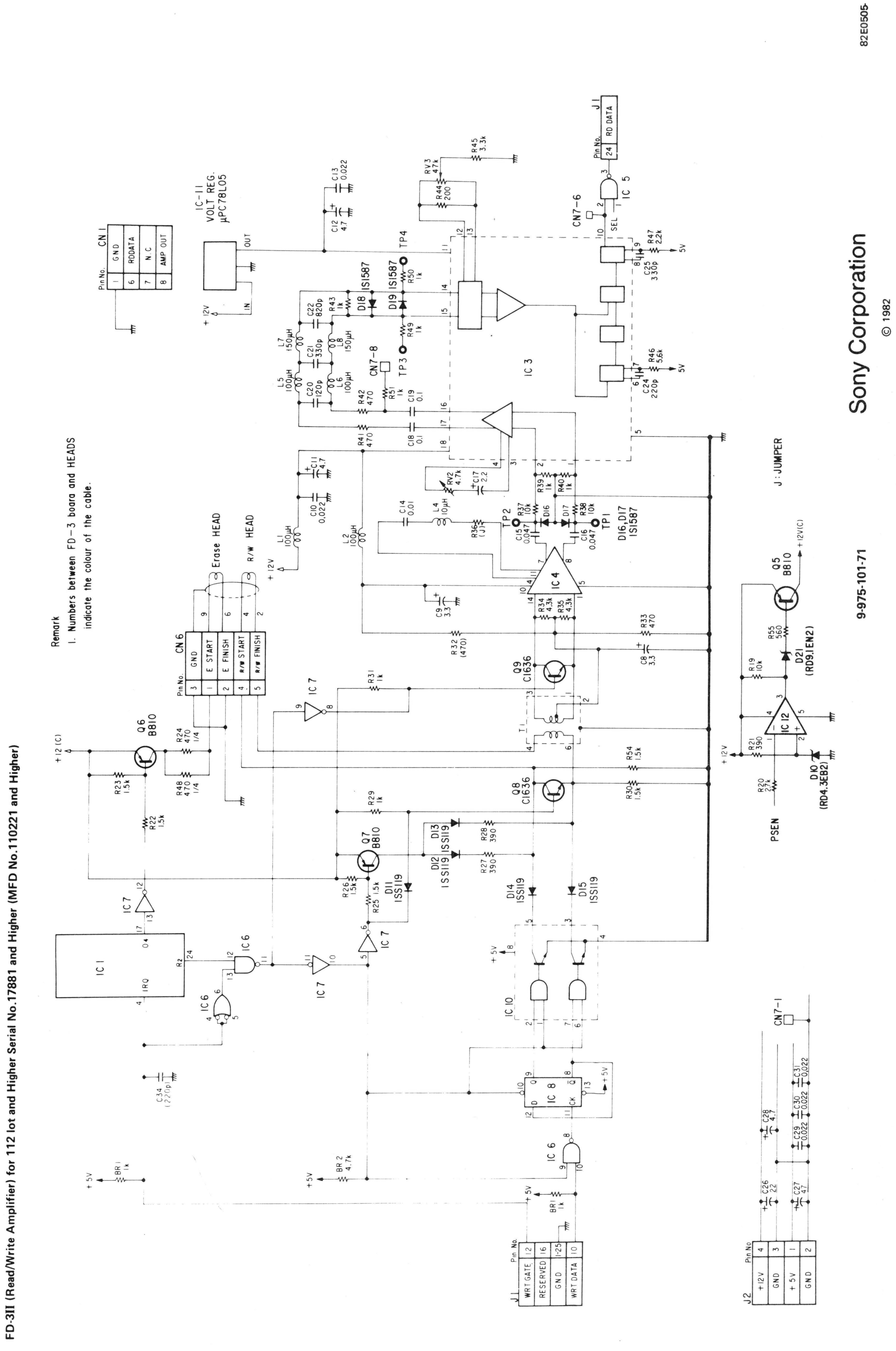
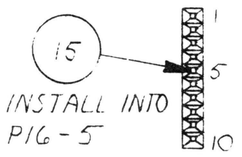
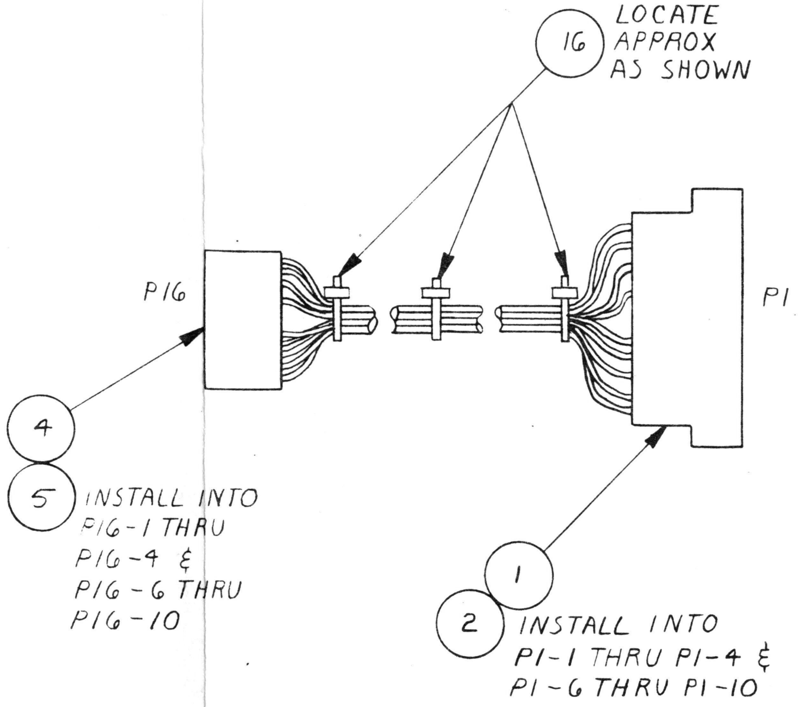

FD-3II (Read/Write Amplifier) for 112 lot and Higher Serial No.17881 and Higher (MFD No.110221 and Higher)
Remark
1. Numbers between FD-3 board and HEADS indicate the colour of the cable.
Erase HEAD
R/W HEAD
IC-11 VOLT REG. μPC78L05
J: JUMPER
Sony Corporation
© 1982
9-975-101-71
82E0505

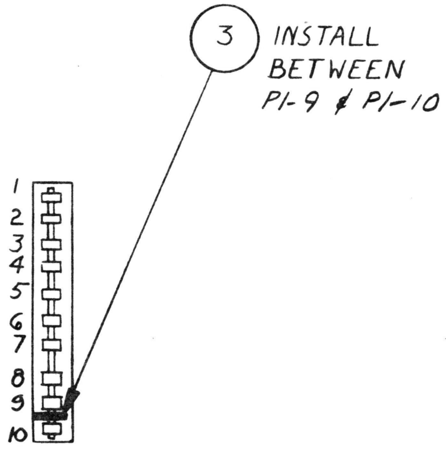
Figure 6-14. Disk Drive (A11, A12) Parts Location and Wiring Diagrams (Sheet 16 of 16).



⑮
INSTALL INTO
P16-5
1
5
10



⑯ LOCATE
APPROX
AS SHOWN
P16
P1
④
⑤ INSTALL INTO
P16-1 THRU
P16-4 &
P16-6 THRU
P16-10
①
② INSTALL INTO
P1-1 THRU P1-4 &
P1-6 THRU P1-10



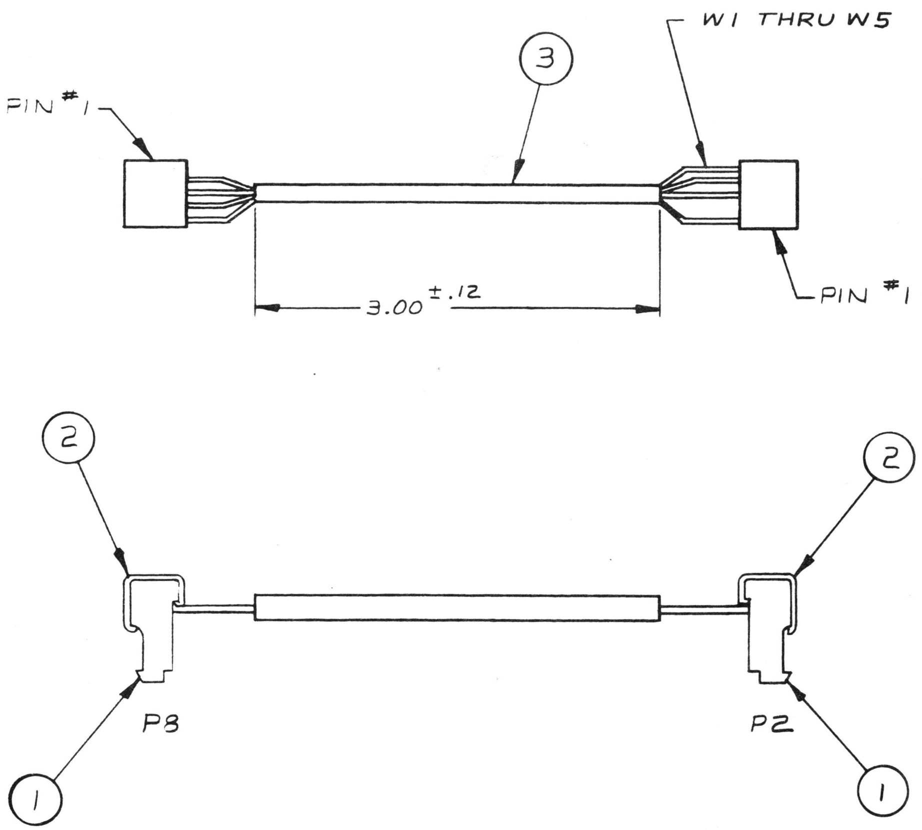
③ INSTALL
BETWEEN
P1-9 & P1-10
1
2
3
4
5
6
7
8
9
10

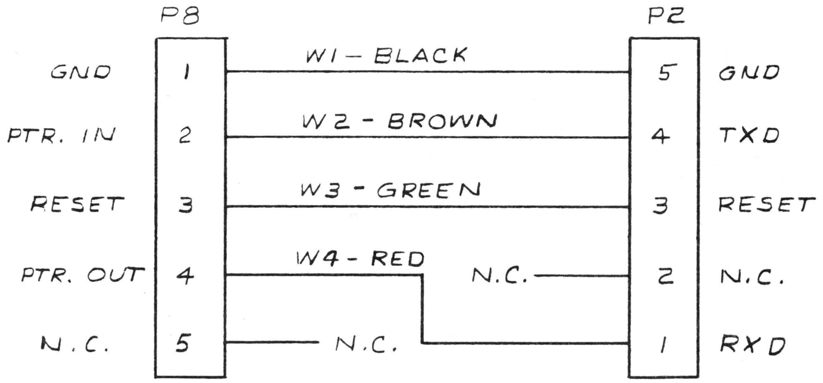
NOTES:

1. STRIP & CRIMP WIRES & INSTALL PER MANUFACTURE'S INSTRUCTIONS

WIRE RUN LIST										
WIRE					FROM			TO		
ITEM NO.	REF. DES.	AWG.	COLOR	LENGTH±.12	REF DES	TERM WITH	INSUL WITH	REF DES	TERM WITH	INSUL WITH
⑦	W1	22	BRN	6.75	P16-1	⑤ SEE NOTE 1	—	P1-1	② SEE NOTE 1	—
⑥	W2	↑	RED	↑	P16-2	↑	—	P1-2	↑	—
⑫	W3	↓	ORG	↓	P16-3	↓	—	P1-3	↓	—
⑨	W4	22	YEL	6.75	P16-4	⑤ SEE NOTE 1	—	P1-4	② SEE NOTE 1	—
—	—	—	—	—	P16-5	—	—	P1-5	—	—
⑭	W6	22	BLU	6.75	P16-6	⑤ SEE NOTE 1	—	P1-6	② SEE NOTE 1	—
⑪	W7	↑	VIO	↑	P16-7	↑	—	P1-7	↑	—
⑬	W8		GRY		P16-8		—	P1-8		—
⑧	W9	↓	WHT	↓	P16-9	↓	—	P1-9	↓	—
⑩	W10	22	BLK	6.75	P16-10	⑤ SEE NOTE 1	—	P1-10	② SEE NOTE 1	—

Figure 6-15. Cable Assemblies Schematic Diagrams (Sheet 1 of 6).


W1 THRU W5
③
PIN #1
PIN #1
3.00 ±.12
②
②
P8
P2
①
①


P8
P2
GND
PTR. IN
RESET
PTR. OUT
N.C.
1
2
3
4
5
W1 - BLACK
W2 - BROWN
W3 - GREEN
W4 - RED
N.C.
N.C.
5
4
3
2
1
GND
TXD
RESET
N.C.
RXD

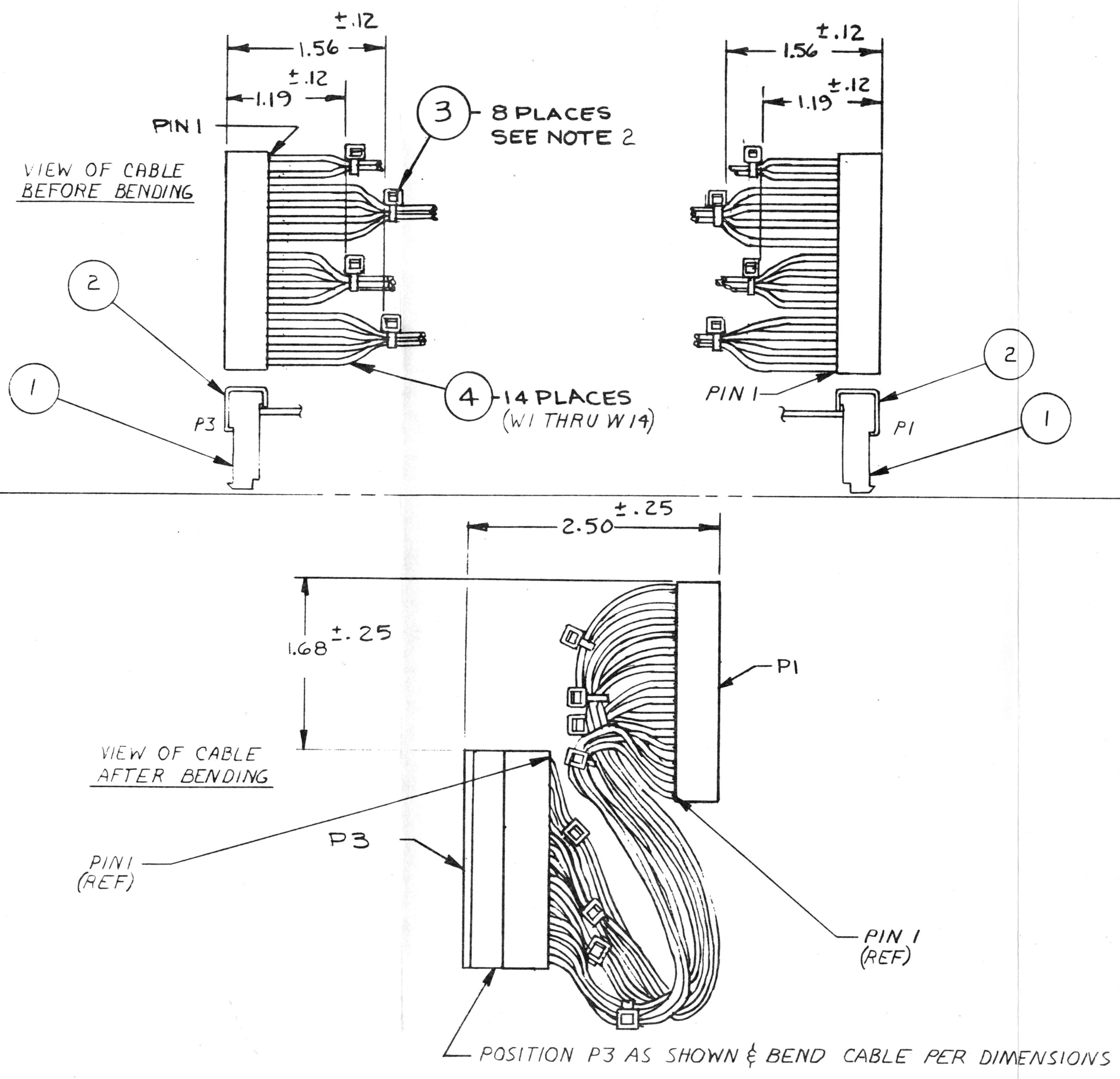
SCHEMATIC DIAGRAM

WIRE RUN LIST										
WIRE					FROM			TO		
ITEM NO.	REF. DES.	AWG.	COLOR	LENGTH (±.12)	REF DES	TERM WITH	INSUL WITH	REF DES	TERM WITH	INSUL WITH
④	W1	22	BLK	5.00	P8-1	NOTE 1	—	P2-5	NOTE 1	—
⑤	W2	22	BRN	5.00	P8-2	NOTE 1	—	P2-4	NOTE 1	—
⑥	W3	22	GRN	5.00	P8-3	NOTE 1	—	P2-3	NOTE 1	—
⑦	W4	22	RED	5.00	P8-4	NOTE 1	—	P2-1	NOTE 1	—

NOTES:

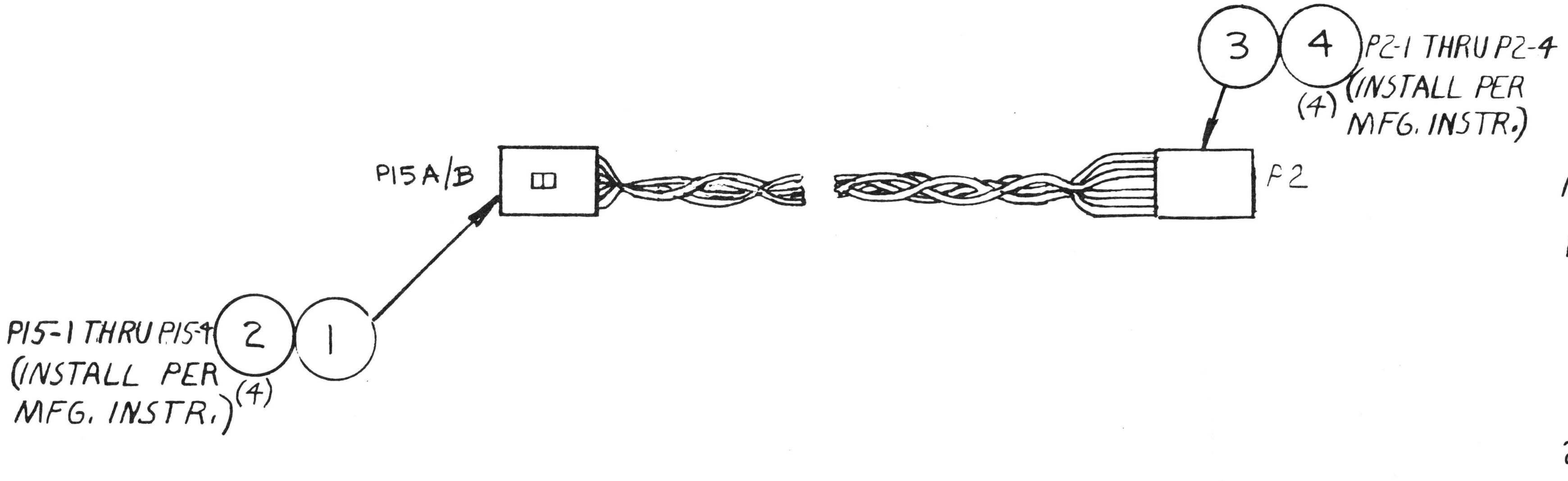
1. INSTALL PER MANUFACTURER'S INSTRUCTIONS.

Figure 6-15. Cable Assemblies Schematic Diagrams (Sheet 2 of 6).


±.12
1.56
±.12
1.19
PIN 1
VIEW OF CABLE BEFORE BENDING
3 - 8 PLACES SEE NOTE 2
2
1
P3
4 -14 PLACES (W1 THRU W14)
±.12
1.56
±.12
1.19
PIN 1
2
1
P1
±.25
2.50
1.68 ±.25
P1
VIEW OF CABLE AFTER BENDING
PIN 1 (REF)
P3
PIN 1 (REF)
POSITION P3 AS SHOWN & BEND CABLE PER DIMENSIONS SHOWN

WIRE RUN LIST										
WIRE					FROM			TO		
ITEM NO.	REF DES.	AWG	COLOR	LENGTH ±.12	REF DES.	TERM. WITH	INSUL. WITH	REF DES.	TERM. WITH	INSUL. WITH
④	W1	18	BLK	6.5	P3-1	SEE NOTE 1	—	P1-14	SEE NOTE 1	—
▲	W2	▲	▲	▲	P3-2	▲	▲	P1-13	▲	▲
	W3				P3-3			P1-12		
	W4				P3-4			P1-11		
	W5				P3-5			P1-10		
	W6				P3-6			P1-9		
	W7				P3-7			P1-8		
	W8				P3-8			P1-7		
	W9				P3-9			P1-6		
	W10				P3-10			P1-5		
	W11				P3-11			P1-4		
	W12				P3-12			P1-3		
▼	W13	▼	▼	▼	P3-13	▼	▼	P1-2	▼	▼
④	W14	18	BLK	6.5	P3-14	SEE NOTE 1	—	P1-1	SEE NOTE 1	—

Figure 6-15. Cable Assemblies Schematic Diagrams (Sheet 3 of 6).


3
4
P2-1 THRU P2-4
(4) (INSTALL PER MFG. INSTR.)
P15A/B
P2
P15-1 THRU P15-4
2
1
(INSTALL PER MFG. INSTR.) (4)

NOTES:

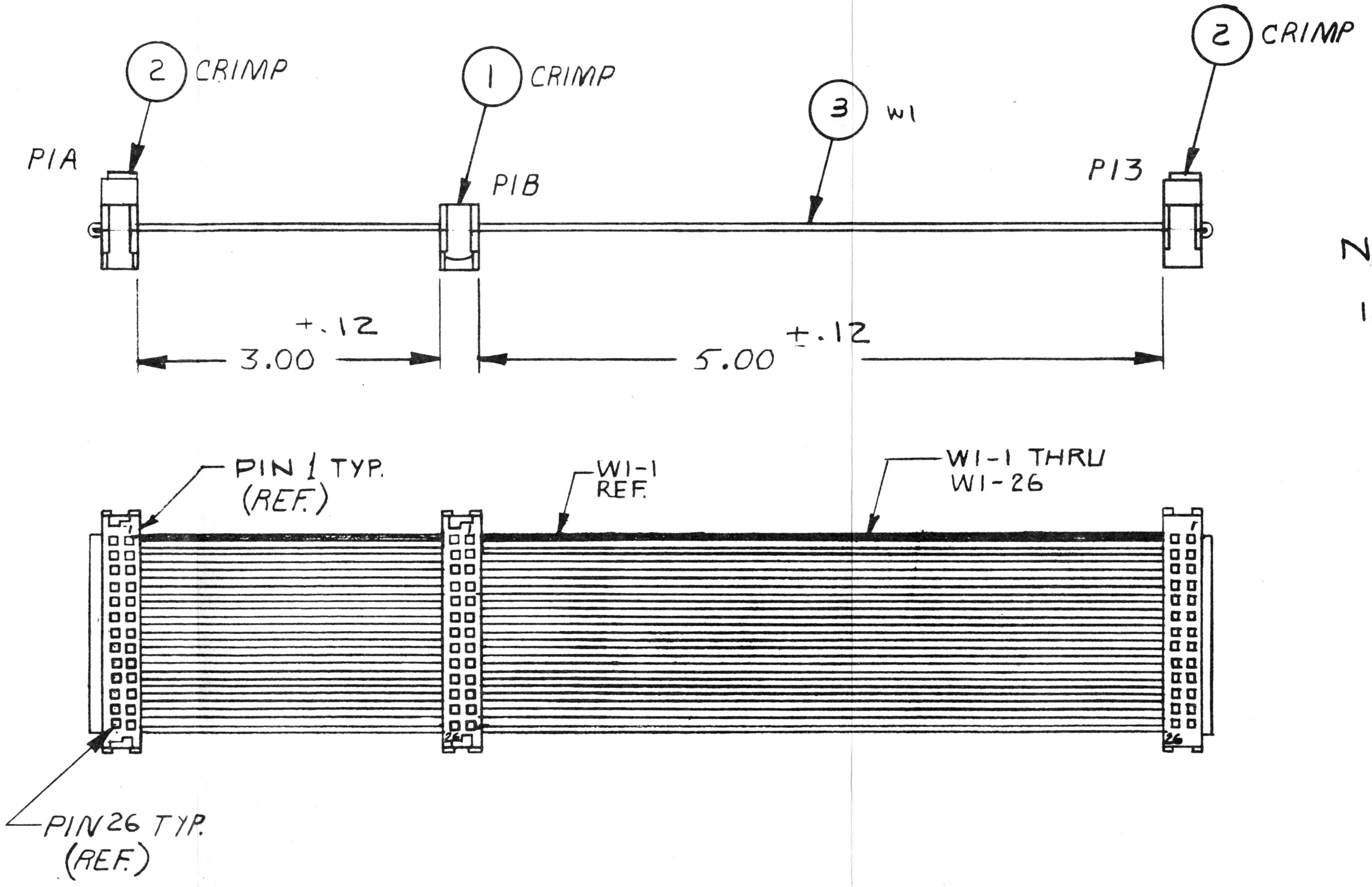
1. PRIOR TO INSTALLING ITEM 4 (CONTACTS) STRIP RESPECTIVE WIRES ITEMS 6 7 & 8 ONE END ONLY .12 ± .03 DO NOT TIN. CRIMP CONTACTS PER MFG'S INSTRUCTIONS.

2. CRIMP ITEM 2 PER MFG. INSTR.

WIRE RUN LIST												
WIRE						FROM			TO			REMARKS
RUN NO.	ITEM NO.	REF. DES.	AWG	COLOR	LENGTH ±.25	REF. DES.	TERM WITH	INSUL WITH	REF DES	TERM WITH	INSUL WITH	
1	⑧	W 1	20	YEL	5.00	P15A/B-1	ITEM ② NOTE 2	—	P2-1	ITEM ④ NOTE 1	—	TWISTED
2	⑥	W2	20	BLK	↑	P15A/B-2	↑	—	P2-2	↑	—	
3	⑥	W3	20	BLK	↓	P15A/B-3	↓	—	P2-3	↓	—	
4	⑦	W4	20	RED	5.00	P15A/B-4	ITEM ② NOTE 2	—	P2-4	ITEM ④ NOTE 1	—	

CABLE W4

Figure 6-15. Cable Assemblies Schematic Diagrams (Sheet 4 of 6).


2 CRIMP
1 CRIMP
3 W1
2 CRIMP
P1A
P1B
P13
+.12
3.00
5.00 ±.12
PIN 1 TYP. (REF.)
W1-1 REF.
W1-1 THRU W1-26
26
26
PIN 26 TYP. (REF.)

NOTES

1. CRIMP W1-1 THRU W1-26 TO RESPECTIVE PINS OF P1A, P1B & P13

CABLE W5

Figure 6-15. Cable Assemblies Schematic Diagrams (Sheet 5 of 6).

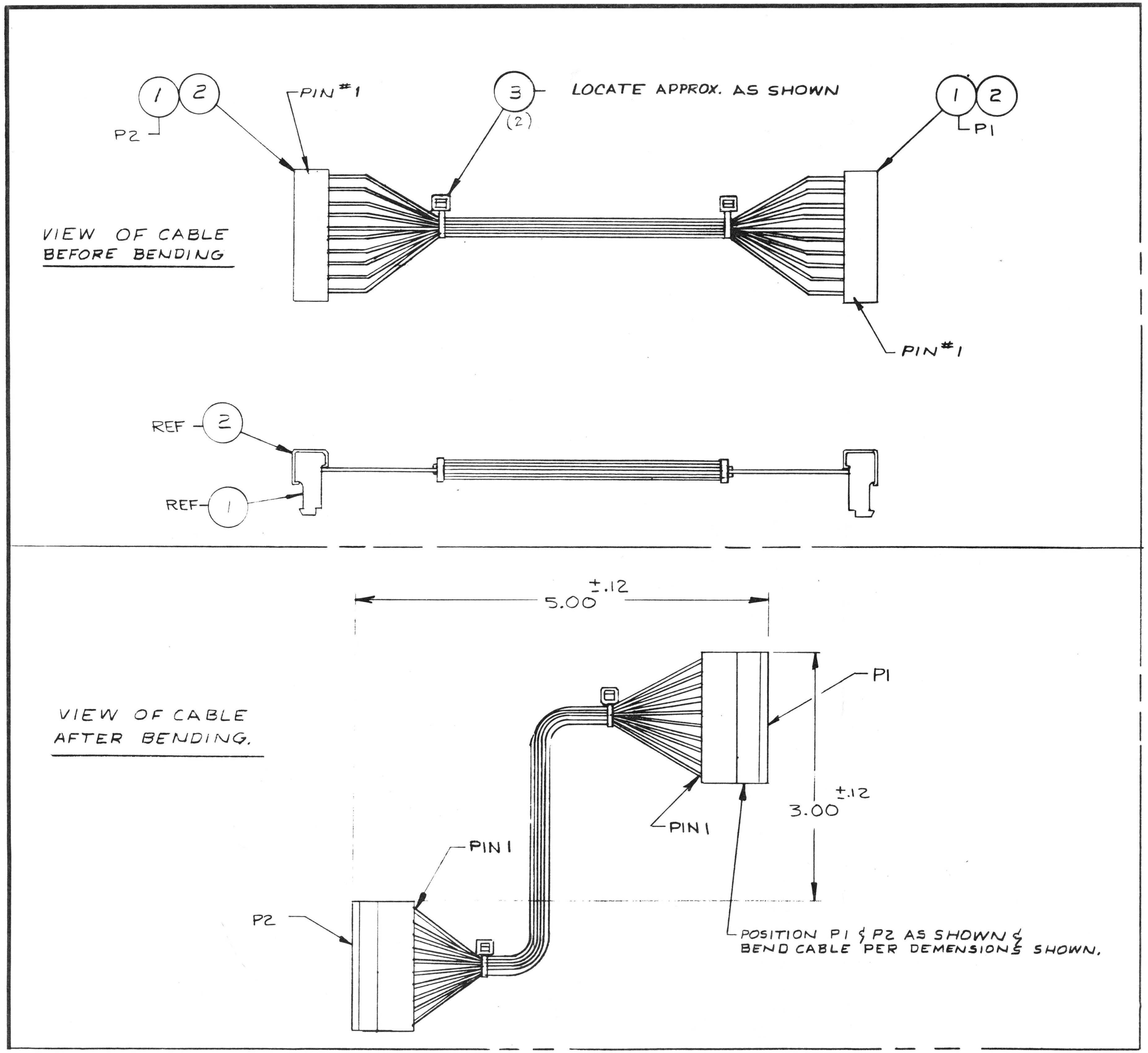

1
2
P2
PIN #1
3
(2)
LOCATE APPROX. AS SHOWN
1
2
P1
VIEW OF CABLE BEFORE BENDING
PIN #1
REF 2
REF 1
5.00 ±.12
P1
VIEW OF CABLE AFTER BENDING.
3.00 ±.12
PIN 1
PIN 1
P2
POSITION P1 & P2 AS SHOWN & BEND CABLE PER DEMENSIONS SHOWN.

Figure 6-15. Cable Assemblies Schematic Diagrams (Sheet 6 of 6).

WIRE RUN LIST										
WIRE					FROM			TO		
ITEM NO.	REF DES	AWG	COLOR	LENGTH (±.12)	REF DES	TERM WITH	INSUL WITH	REF DES	TERM WITH	INSUL WITH
④	W1	18	BRN	8.00	P2-1	NOTE 1	—	P1-10	NOTE 1	—
⑤	W2	18	RED	8.00	P2-2	NOTE 1	—	P1-9	NOTE 1	—
⑥	W3	18	ORG	8.00	P2-3	NOTE 1	—	P1-8	NOTE 1	—
⑦	W4	18	YEL	8.00	P2-4	NOTE 1	—	P1-7	NOTE 1	—
⑧	W5	18	GRN	8.00	P2-5	NOTE 1	—	P1-6	NOTE 1	—
⑨	W6	18	DK. BLUE	8.00	P2-6	NOTE 1	—	P1-5	NOTE 1	—
⑩	W7	18	VIO	8.00	P2-7	NOTE 1	—	P1-4	NOTE 1	—
⑪	W8	18	GRAY	8.00	P2-8	NOTE 1	—	P1-3	NOTE 1	—
⑫	W9	18	WHT	8.00	P2-9	NOTE 1	—	P1-2	NOTE 1	—
⑬	W10	18	BLK	8.00	P2-10	NOTE 1	—	P1-1	NOTE 1	—

NOTES:

1. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
2. WIRE CONNECTORS PER WIRE RUN LIST BELOW.

ITEM NO.	PART NUMBER	DESCRIPTION	[illegible]	[illegible]-02	REF. DES.
			QUANTITY		
1	A0002-14548-00	BASE CABINET ASSY.	1	1	
1	A0002-14548-01	BASE CABINET ASSY.(W Z80)	—	—	
2	A0002-14548-02	BASE CABINET ASSY.(W RS232)	—	—	
2	A0002-14548-03	BASE CABINET ASSY.(W Z80,RS232)	—	—	
3	A0002-14549-00	FRONT PANEL ASSY.(PLAIN FILTER)	1	1	
3	A0002-14549-01	FRONT PANEL ASSY.(AMBER FILTER)	—	—	
3	A0002-14549-02	FRONT PANEL ASSY.(GREEN FILTER)	—	—	
4	A0002-14561	POWER SUPPLY ASSY.(SET 110V)	1	—	
4	A0002-14561	POWER SUPPLY ASSY.(SET220V)	—	1	
31	B0001-14785-00	VOLTAGE LABEL 110V	1	—	
32	B0001-14785-01	VOLTAGE LABEL 220/240V	—	1	
14	A0002-14330	POWER CORD ASSY.	1	1	
13	A0002-14562	KEYBOARD HOUSING ASSY.	1	1	
10	A0002-14555	POWER SIGNEL CABLE ASSY.	1	1	
11	A0002-14 619	PANEL HOUSING ASSY.	1	1	
6	A0002-14786	CRT CONTROLLER BOARD ASSY.(IBM)	1	1	
7	A0002-14502-00	CPU 64K MEMORY BOARD ASSY.	1	1	
15	B0001-14686	DOT LOGO	1	1	
17	C0001-14645	IDENTIFICATION LABEL	1	1	
18	C0001-14685	FCC LABEL	1	1	
*	A0002-14802-02	HARDWARE KIT	1	1	
		OPTIONS			
	A0002-14739	300 BAUD MODEM BOARD (COM 301)	—	—	
	A0002-14740	300/1200 BAUD MODEM BOARD (COM 302)	—	—	
	A0002-14791	PARALLEL PORT BOARD (PER 302)	—	—	
	A0002-14789	8087 ARITHMETIC PROCESSOR (PER 303)	—	—	
	A0002-14793	IEEE/488 INTERFACE BOARD ( )	—	—	

Figure 6-16. Configuration Guide (Sheet 1 of 6).

ITEM NO.	PART NUMBER	DESCRIPTION	16002-01	16002-02	16002-11	16002-12	16002-13	16002-14	REF. DES.
				220	QUANTITY	220		220 ✓	
1	A0002-14548-00	BASE CABINET ASSY.	—	—	1	1	—	—	
1	A0002-14548-01	BASE CABINET ASSY.(W Z80)	—	—	—	—	—	—	
2	A0002-14548-02	BASE CABINET ASSY.(W RS232)	1	1	—	—	1	1	
2	A0002-14548-03	BASE CABINET ASSY.(W Z80,RS232)	—	—	—	—	—	—	
3	A0002-14549-00	FRONT PANEL ASSY.(PLAIN FILTER)	1	1	1	1	1	1	
3	A0002-14549-01	FRONT PANEL ASSY.(AMBER FILTER)	—	—	—	—	—	—	
3	A0002-14549-02	FRONT PANEL ASSY.(GREEN FILTER)	—	—	—	—	—	—	
4	A0002-14561	POWER SUPPLY ASSY.(SET 110V)	1	—	1	—	1	—	
4	A0002-14561	POWER SUPPLY ASSY.(SET220V)	—	1	—	1	—	1	
31	B0001-14785-00	VOLTAGE LABEL 110V	1	—	1	—	1	—	
32	B0001-14785-01	VOLTAGE LABEL 220/240V	—	1	—	1	—	1	
14	A0002-14330	POWER CORD ASSY.	1	1	1	1	1	1	
13	A0002-14562	KEYBOARD HOUSING ASSY.	1	1	1	1	1	1	
10	A0002-14555	POWER SIGNEL CABLE ASSY.	1	1	1	1	1	1	
11	A0002-14619	PANEL HOUSING ASSY.	1	1	1	1	1	1	
6	A0002-14786	CRT CONTROLLER BOARD ASSY.(IBM)	1	1	1	1	1	1	
8	A0002-14502-01	CPU 128K MEMORY BOARD ASSY.	1	1	1	1	1	1	
15	D0001-14586	DOT LOGO	1	1	1	1	1	1	
17	C0001-14645	IDENTIFICATION LABEL	1	1	1	1	1	1	
18	C0001-14685	FCC LABEL	1	1	1	1	1	1	
/	A0002-14802-02	HARDWARE KIT	1	1	1	1	1	1	
19	0430-00020	DRIVE,MICRO-FLOPPY DISK	1	1	—	—	—	—	
20	A0002-14558	ASSY,CABLE POWER(MOTHER BD.TO DISK DRIVE)	1	1	—	—	—	—	
		OPTIONS							
	A0002-14739	300 BAUD MODEM BOARD (COM 301)	—	—	—	—	—	—	
	A0002-14740	300/1200 BAUD MODEM BOARD (COM 302)	—	—	—	—	—	—	
	A0002-14791	PARALLEL PORT BOARD (PER 302)	—	—	—	—	—	—	
	A0002-14789	8087 ARITHMETIC PROCESSOR (PER 303)	—	—	—	—	—	—	
	A0002-14793	IEEE/488 INTERFACE BOARD ( )	—	—	—	—	—	—	

Figure 6-16. Configuration Guide (Sheet 2 of 6).

ITEM NO.	PART NUMBER	DESCRIPTION	16003-01	16003-02 220	16003-11	16003-12 220	16003-13	16003-14 220	REF. DES.
			QUANTITY						
1	A0002-14548-00	BASE CABINET ASSY.	—	—	1	1	—	—	
1	A0002-14548-01	BASE CABINET ASSY.(W Z80)	—	—	—	—	—	—	
2	A0002-14548-02	BASE CABINET ASSY.(W RS232)	1	1	—	—	1	1	
2	A0002-14548-03	BASE CABINET ASSY.(W Z80,RS232)	—	—	—	—	—	—	
3	A0002-14549-00	FRONT PANEL ASSY.(PLAIN FILTER)	1	1	1	1	1	1	
3	A0002-14549-01	FRONT PANEL ASSY.(AMBER FILTER)	—	—	—	—	—	—	
3	A0002-14549-02	FRONT PANEL ASSY.(GREEN FILTER)	—	—	—	—	—	—	
4	A0002-14561	POWER SUPPLY ASSY.(SET 110V)	1	—	1	—	1	—	
4	A0002-14561	POWER SUPPLY ASSY.(SET220V)	—	1	—	1	—	1	
31	B0001-14785-00	VOLTAGE LABEL 110V	1	—	1	—	1	—	
32	B0001-14785-01	VOLTAGE LABEL 220/240V	—	1	—	1	—	1	
14	A0002-14330	POWER CORD ASSY.	1	1		1	1	1	
13	A0002-14562	KEYBOARD HOUSING ASSY.	1	1	1	1	1	1	
10	A0002-14555	POWER SIGNEL CABLE ASSY.	1	1	1	1	1	1	
12	A0002-14550	TOP HOUSING ASSY.	1	1	1	1	1	1	
6	A0002-14786	CRT CONTROLLER BOARD ASSY.(IBM)	1	1	1	1	1	1	
8	A0002-14502-01	CPU 128K MEMORY BOARD ASSY.	1	1	1	1	1	1	
15	D0001-14586	DOT LOGO	1	1	1	1	1	1	
17	C0001-14645	IDENTIFICATION LABEL	1	1	1	1	1	1	
18	C0001-14685	FCC LABEL	1	1	1	1	1	1	
≁	A0002-14802-0 1	HARDWARE KIT	1	1	1	1	1	1	
19	0430-00020	DRIVE,MICRO-FLOPPY DISK	1	1	—	—	—	—	
20	A0002-14558	ASSY,CABLE POWER(MOTHER BD.TO DISK DRIVE)	1	1	—	—	—	—	
5	A0002-14552	Q160 THERMAL GRAPHIC PRINTER	1	1	1	1	1	1	
		OPTIONS							
	A0002-14739	300 BAUD MODEM BOARD (COM 301)	—	—	—	—	—	—	
	A0002-14740	300/1200 BAUD MODEM BOARD (COM 302)	—	—	—	—	—	—	
	A0002-14791	PARALLEL PORT BOARD (PER 302)	—	—	—	—	—	—	
	A0002-14789	8087 ARITHMETIC PROCESSOR (PER 303)	—	—	—	—	—	—	
	A0002-14793	IEEE/488 INTERFACE BOARD ( )	—	—	—	—	—	—	

Figure 6-16. Configuration Guide (Sheet 3 of 6).

ITEM NO.	PART NUMBER	DESCRIPTION	16004-01	16004-02 220	QUANTITY	REF. DES.
1	A0002-14548-00	BASE CABINET ASSY.	—	—		
1	A0002-14548-01	BASE CABINET ASSY.(W Z80)	—	—		
2	A0002-14548-02	BASE CABINET ASSY.(W RS232)	1	1		
2	A0002-14548-03	BASE CABINET ASSY.(W Z80,RS232)	—	—		
3	A0002-14549-00	FRONT PANEL ASSY.(PLAIN FILTER)	1	1		
3	A0002-14549-01	FRONT PANEL ASSY.(AMBER FILTER)	—	—		
3	A0002-14549-02	FRONT PANEL ASSY.(GREEN FILTER)	—	—		
4	A0002-14561	POWER SUPPLY ASSY.(SET 110V)	1	—		
4	A0002-14561	POWER SUPPLY ASSY.(SET220V)	—	1		
31	B0001-14785-00	VOLTAGE LABEL 110V	1	—		
32	B0001-14785-01	VOLTAGE LABEL 220/240V	—	1		
14	A0002-14330	POWER CORD ASSY.	1	1		
13	A0002-14562	KEYBOARD HOUSING ASSY.	1	1		
10	A0002-14555	POWER SIGNEL CABLE ASSY.	1	1		
11	A0002-14619	PANEL HOUSING ASSY.	1	1		
6	A0002-14786	CRT CONTROLLER BOARD ASSY.(IBM)	1	1		
9	A0002-14502-03	CPU 256K MEMORY BOARD ASSY.	1	1		
15	D0001-14566	DOT LOGO	1	1		
17	C0001-14645	IDENTIFICATION LABEL	1	1		
18	C0001-14685	FCC LABEL	1	1		
7	A0002-14802-0 2	HARDWARE KIT	1	1		
19	0430-00020	DRIVE,MICRO-FLOPPY DISK	1	1		
20	A0002-14558	ASSY,CABLE POWER(MOTHER BD.TO DISK DRIVE)	1	1		
		OPTIONS				
	A0002-14739	300 BAUD MODEM BOARD (COM 301)	—	—		
	A0002-14740	300/1200 BAUD MODEM BOARD (COM 302)	—	—		
	A0002-14791	PARALLEL PORT BOARD (PER 302)	—	—		
	A0002-14789	8087 ARITHMETIC PROCESSOR (PER 303)	—	—		
	A0002-14793	IEEE/488 INTERFACE BOARD ( )	—	—		
	A0002-14792	256K ADDITIONAL MEMORY BOARD (MEM 302)	—	—		

Figure 6-16. Configuration Guide (Sheet 4 of 6).

ITEM NO	PART NUMBER	DESCRIPTION	16005-01	16005-02	QUANTITY	REF. DES.
1	A0002-14548-00	BASE CABINET ASSY.	—	—		
1	A0002-14548-01	BASE CABINET ASSY.(W Z80)	—	—		
2	A0002-14548-02	BASE CABINET ASSY.(W RS232)	1	1		
2	A0002-14548-03	BASE CABINET ASSY.(W Z80,RS232)	—	—		
3	A0002-14549-00	FRONT PANEL ASSY.(PLAIN FILTER)	1	1		
3	A0002-14549-01	FRONT PANEL ASSY.(AMBER FILTER)	—	—		
3	A0002-14549-02	FRONT PANEL ASSY.(GREEN FILTER)	—	—		
4	A0002-14561	POWER SUPPLY ASSY.(SET 110V)	1	—		
4	A0002-14561	POWER SUPPLY ASSY.(SET220V)	—	1		
31	B0001-14785-00	VOLTAGE LABEL 110V	1	—		
32	B0001-14785-01	VOLTAGE LABEL 220/240V	—	1		
14	A0002-14330	POWER CORD ASSY.	1	1		
13	A0002-14562	KEYBOARD HOUSING ASSY.	1	1		
10	A0002-14555	POWER SIGNEL CABLE ASSY.	1	1		
12	A0002-14550	TOP HOUSING ASSY.	1	1		
6	A0002-14786	CRT CONTROLLER BOARD ASSY.(IBM)	1	1		
9	A0002-14502-03	CPU 256K MEMORY BOARD ASSY.	1	1		
15	D0001-14586	DOT LOGO	1	1		
17	C0001-14645	IDENTIFICATION LABEL	1	1		
18	C0001-14685	FCC LABEL	1	1		
[illegible]	A0002-14802-01	HARDWARE KIT	1	1		
19	0430-00020	DRIVE,MICRO-FLOPPY DISK	1	1		
20	A0002-14558	ASSY,CABLE POWER(MOTHER BD.TO DISK DRIVE)	1	1		
5	A0002-14552	Q160 THERMAL GRAPHIC PRINTER	1	1		
		OPTIONS				
	A0002-14739	300 BAUD MODEM BOARD (COM 301)	—	—		
	A0002-14740	300/1200 BAUD MODEM BOARD (COM 302)	—	—		
	A0002-14791	PARALLEL PORT BOARD (PER 302)	—	—		
	A0002-14789	8087 ARITHMETIC PROCESSOR (PER 303)	—	—		
	A0002-14793	IEEE/488 INTERFACE BOARD ( )	—	—		
	A0002-14792	256K ADDITIONAL MEMORY BOARD (MEM 302)	—	—		

Figure 6-16. Configuration Guide (Sheet 5 of 6).

ITEM NO.	PART NUMBER	DESCRIPTION	QUANTITY																															REF. DES.

Figure 6-16. Configuration Guide (Sheet 6 of 6).

SECTION VII

DIAGNOSTIC PROCEDURES AND ERROR MESSAGES

7-1. GENERAL.

7-2. This section contains tabular descriptions of the applicable diagnostic procedures and error messages as an aid in diagnosing hardware and software problems in the Computer.

7-3. MS-DOS ERROR MESSAGES.

7-4. Error messages with short descriptions, when applicable, are listed in Table 7-1.

7-5. POWER-UP AND EXTENDED DIAGNOSTICS.

7-6. Information for the power-up and extended diagnostics (firmware) and the possible error messages are described in Table 7-2. Start the extended diagnostic using the following steps.

a. Power up the instrument.
b. After the power up diagnostics are complete and the main menu is displayed, select RUN EXTENDED DIAGNOSTICS from the menu (press 4 key).
c. The extended diagnostics main menu should appear on the display. Press the number for the diagnostic test desired.
d. Use the instructions on the display and the data in Table 7-2 to perform the tests.

7-7. C/S-DISK DIAGNOSTICS.

7-8. Descriptions of the C/S-Disk Diagnostics and the related error messages are given in Table 7-3. Start the C/S-DISK Diagnostics using the following steps.

a. Power up the instrument.
b. After the power-up diagnostics are complete and the main menu is displayed, insert the diagnostic disk into Drive A.
c. Select the proper number from the menu to load the system from Drive A.
d. After the Diagnostic Executive Main Menu is displayed, run the desired test sequence by pressing the proper test number, then press the [RETN] key to start the program.
e. Use the instructions on the display and the data in Table 7-3 to perform the tests.

MSDOS CHECK DISK ERROR MESSAGES

ALLOCATION ERROR FOR FILE <FILENAME>

File named while running CHECKDISK (CHKDSK) had a data block allocated that did not exist. File does not exist.

DIST NOT INITIALIZED

No directory or file allocation found. File may still exist. It may be possible to recover file by copying it to another disk.

DIRECTORY ERROR - FILE: <FILENAME>

No valid data blocks are allocated to the named file. CHKDSK deletes the file.

FILE CROSS-LINKED: <FILENAME> AND <FILENAME>

The same data block is allocated for the two files. Copy both files, delete the originals.

XXXXXX BYTES OF DISK SPACE FREED

File space has been allocated, but files were never created. CHKDSK frees that space for the user.

FILE CANNOT BE COPIED ONTO ITSELF

0 FILES COPIED

First filespec in a copy command is on the default drive and the second filespec is not given. Name file receiving copy.

CONTENT OF DESTINATION LOST BEFORE COPY

Input copy file is found and name matches destination. That input file is skipped.

INVALID DATE

Date parameters or separators are not legal. Retype date.

INVALID TIME

Time parameters or separators are not legal. Retype time.

FILE CANNOT BE CONVERTED

Input file specified in EXE2BIN is not in .EXE. format, code is less than 64K, or a stack segment exists.

FIX-UP NEEDED - BASE SEGMENT (HEX)

CS:IP not specified in EXE2BIN. Enter segment and offset of address where program will reside.

DUPLICATE FILE NAME NOT FOUND

Attempt to rename a file to a name already present in directory or input file does not exist. Verify names.

Table 7-1. Computer Error Messages (Sheet 1 of 3).

ERROR MESSAGES (con't)

NO ROOM FOR SYSTEM ON DESTINATION DISK	Target system disk is not completely blank or does not contain hidden system files. FORMAT /s and repeat SYS command.
INCOMPATIBLE SYSTEM SIZE	Hidden files take up different amount of space on source disk and new system.
CANNOT EDIT .BAK FILE - RENAME FILE	.BAK extension is reserved for backup files. They cannot be edited. Rename or copy file without .BAK extension.
NO ROOM IN DIRECTORY FOR FILE	When creating a new file either: 1) directory was full 2) illegal disk drive was specified or 3) illegal filename was specified.
ENTRY ERROR	Last command entered contained a syntax error. Reenter command.
LINE TOO LONG	Line exceeds 254 characters with REPLACE (REP) command. The replacement causes the line to exceed the limit.
DISK FULL - FILE WRITE NOT COMPLETE	at END command, the disk did not contain sufficient space for entire file. Some of the file may have been written to disk.
INSUFFICIENT DISK SPACE 0 FILES COPIED	Disk did not contain sufficient space to save file. Insert new disk and resave file.
SPECIAL ERROR MESSAGES	
NON-SYSTEM DISK.PLEASE ENTER A NEW DISK AND DEPRESS ANY KEY	Disk in drive is not an MS/DOS system disk. Reboot system with system disk.
AUX ERROR!	MS/DOS received bad status in transmitting or receiving data from port.

Table 7-1. Computer Error Messages (Sheet 2 of 3).

AUX TRANSMIT ERROR!

Clear to send bit not set or transmitter buffer not empty.

PRINTER I/O ERROR

I/O error in printer interface.

PRINTER TIMEOUT!

Paper jam or printer buffer overflow.

UNABLE TO OPEN COMMAND.COM

READ ERROR WHILE LOADING COMMAND.COM

FILE ALLOCATION TABLE BAD FOR DRIVE x

The copy in memory of one of the allocation tables has pointers to nonexistent blocks. Possibly the disk was not formatted before use.

NOTE

The following MS/DOS errors await response to the following: Abort, Retry, Ignore?

WRITE PROTECT ERROR ON DRIVE x

NOT READY ERROR WHILE [READING,WRITING] ON DRIVE x

SEEK ERROR WHILE READING ON DRIVE x

DATA ERROR WHILE [READING<WRITING] ON DRIVE x

SECTOR NOT FOUND ON DRIVE x

WRITE FAULT ERROR ON DRIVE x

DISK ERROR WHILE [READING,WRITING] ON DRIVE x

Table 7-1. Computer Error Messages (Sheet 3 of 3).

GENERAL INFORMATION

I. POWER-UP DIAGNOSTIC

The power-up diagnostic is executed automatically on power-up as well as on system reset and is intended to be a confidence test for the basic resources of the system. It is not intended to be used for the purpose of debugging the hardware.

The power-up diagnostic strategy for failure detection is as follows:

Any failure in the first 16K of dynamic RAM is considered to be catastrophic (i.e. fatal). In such a case, the power-up diagnostic gives failure indication on the system speaker via beeps. The dynamic RAM test is then repeated indefinitely. All other errors are considered non-catastrophic. If the first 16K of dynamic RAM is found to be good, then the power-up diagnostic completes the entire test sequence, and if no failures are detected, passes control to the monitor program. On detecting any failures, appropriate error messages are displayed on the Video Display and then the power-up diagnostic waits for a key stroke. On detecting any key stroke, control is passed to the monitor.

The power-up diagnostic executes the following sequence of tests:

1. Dynamic RAM Test
2. Configuration RAM Test
3. Video RAM Test
4. ROM Checksum Test
5. System Timer and Interrupt Test
6. Baud-Rate-Generator Timer Test
7. Keyboard Test
8. Disk Controller Test

Total execution time of power-up diagnostic is normally under 15 seconds. On system reset, a sub-set of the power-up diagnostic will be executed to complete the testing in under 5 seconds.

Error messages displayed by the power-up diagnostics are as follows:

```
*DYNAMIC RAM ERR*
*VIDEO RAM ERR*
*CRC ERR IN ROM #
*CONFIG RAM ERR*
*PIC (8259) ERR*
*SYSTEM TIMER ERR*
*BAUD RATE TIMER ERR*
*KEYBOARD ERR*
*DISK CONTROLLER ERR*
*PARITY ERR*
*POWERFAIL INTR*

TESTING A, TESTING B,.........TESTING %
```

Table 7-2. Power Up And Extended Diagnostics With Possible Error Messages.

Dynamic RAM Test:

The dynamic RAM is located at address 0-3FFFFH in 4 banks with 16K/64K chips and parity on each bank. The procedure followed for this test is as follows:

1. Perform a comprehensive test of first 16K block of dynamic RAM as follows:

   a. Fill all memory with test data = (m.s.b - 1.s.b) of test address. This tests all the locations as well as the address lines by writing a unique pattern at each and every address.
   b. Verify memory for above pattern.
   c. Perform another test run with data being the compliment of the previous data in step a.
   d. Wait 100 msec. before verification in order to test the refresh logic for the dynamic RAM.
   e. Clear all the memory under test to zero after verification.
   f. Any failure here is catastrophic. In that case, beep the failure code and repeat the test indefinitely starting from step a.
   g. If this test passes, this memory is used by the power-up diagnostic for interrupt vectors, buffers, stack and control area.

2. Size the memory in 16K/64K blocks and repeat the above test for the remaining blocks of memory.

3. Check the addressing between blocks by writing the block number into last location of every block and then reading all the block numbers to verify addressing over all the blocks of memory.

4. On system reset, perform quick data and address test for the remainder of dynamic RAM, i.e. from 16K to 48K in the first bank and then for up to three more banks of 64K each if determined to be present. The test procedure is as follows:

   a. Fill all memory with 55AAH pattern
   b. Starting at the lowest address, read and verify a location, write the compliment of itself there and continue until the highest location is reached.
   c. Repeat step b for the complimented pattern.
   d. Perform address test for address lines selecting these banks of memory.
   e. Clear all memory to zero after the test.

Table 7-2. Power Up And Extended Diagnostics With Possible Error Messages.

Configuration RAM Test

The configuration RAM is located at address F0000 - F1FFFH in 2K or 8K block. This is a non-destructive test of the configuration RAM, (contents are restored after completing the test). The procedure is as follows:

a. Determine 2K/8K size of the memory
b. Save current contents of the entire configuration RAM in the first 16K block of dynamic RAM.
c. Verify the configuration RAM for data and address integrity with patterns of test 1 of the Dynamic RAM Test.
d. Restore contents of the configuration RAM.
e. Clear dynamic RAM area to zero.

Video Memory Test

This test verifies the 32K of video RAM mapped at address B0000 - B7FFFFH. The test procedure is as follows:

a. Verify the video RAM for data and address integrity with patterns in test 1 of the Dynamic RAM Test.
b. Set all memory to 2007H pattern in order to clear the display.
c. Initialize CRT controller and enable the display.

ROM Checksum Test

The Computer may contain up to 56K of ROM located at address F2000 - FFFFFH and configured using three chips of 8K bytes each. This test verifies the ROMs by calculating a two byte CRC for the contents of each ROM and comparing with the CRC word stored in the ROM. The test also checks that the ROM is placed in the proper socket by reading the stored ROM ID and comparing with the expected ID for that socket.

System Timer And Interrupt Test

This test verifies the system timer chip for count down and interrupt capabilities. Since this is the first time when interrupt processing of 8259 is used, the failure here could result from a combination of 8253/8259 failures.

Keyboard Test

This test initializes the Keyboard/Printer UART and tests for the Tx Empty interrupt and then sends the "execute self test" command code to the Keyboard. The test then checks for proper status coming back from the Keyboard.

Table 7-2. Power Up And Extended Diagnostics With Possible Error Messages.

Disk Controller Test

This test verifies that the Floppy Disk Controller (FDC) chip is accessible and functional based on some predictable responses from the chip. No actual data transfers to the drive are allowed during this test. The procedure is as follows:

a. Reset and initialize the FDC, wait for an interrupt from the FDC. If no interrupt occurs within 10 msec., then flag error.

b. Read the main status register of FDC. It should have not-busy (CB=0) and ready for data transfer (RQM=1).

c. Issue an "invalid" command. The test fails if the status register STO does not have bit 7 = 1 and bit 6 = 0.

d. Issue a "recalibrate" command and wait for interrupt. No interrupt indicates failure.

Completion Status

The individual power-up diagnostic tests pass/fail status is available in a diagnostic status word (labelled as DIADSTS at address 0000:0200H). This word is zero for no failures, otherwise the bit encoding is as follows:

	7	6	5	4	3	2	1	0
DIAGSTS	k	X	T	I	R	V	C	D
DIAGSTS+1	X	X	X	X	X	W	P	F

D = dynamic RAM failure
C = configuration RAM failure
V = video RAM failure
R = ROM checksum error
I = PIC error
T = system timer failure
k = keyboard test failure
F = FDC test failure
P = parity error
W = Power fail detected
X = not used

NOTE

Indicator bits are set to 1 to indicate a failure.

NOTE

When the Video RAM test is complete (about 4 seconds after power up) a message is displayed on the screen "TESTING" at one second intervals. This message shows that testing is in progress.

On completion, the power-up diagnostic displays pass/fail messages on the screen where any combination of the error messages as appropriate are displayed.

- DYNAMIC RAM ERROR
- CONFIGURATION RAM ERROR
- ROM CHECKSUM ERR,
  ROM # 1, 2, ...
- ROM ID ERR
- SYSTEM TIMER OR INTERRUPT ERR
- BAUD RATE TIMER ERR
- KEYBOARD ERR
- DISK CONTROLLER ERR
- PARITY ERR

II. EXTENDED DIAGNOSTICS

The extended diagnostics are selected via the monitor menu (run extended diagnostics). When selected, a diagnostic menu will be displayed as follows:

```
DOT DIAGNOSTICS

     1.  RETURN TO PREVIOUS MENU
     2.  DISK
     3.  MEMORY
     4.  SYSTEM
     5.  DISPLAY CONFIGURATION

     Enter the number for the desired function>
```

DISK TEST

The test sequence is as follows:

a. Prompt the operator for disk drive (A/B) to be tested.
b. Prompt the operator to insert a formatted scratch diskette in the selected drive and type any key.
c. Display a message: "Starting disk test, type any key to abort".
d. Write entire disk with 00,0FFH pattern, read and verify.
e. Write entire disk with 55H,0AAH pattern, read and verify.
f. Select random track # & sector #, write the selected sector with random data pattern.
g. Repeat step f for another randmo track # & sector #.

Table 7-2. Power Up And Extended Diagnostics With Possible Error Messages.

DISK TEST (con't)

h. Read and verify selected sector in step f.
i. Read and verify selected sector in step g.
j. Repeat steps f thru i 10 times.
k. Increment the pass count, print the current pass number and cumulative error count.
l. Go back to step d.

Upon selection of the Disk Test diagnostics, the following messages will be displayed.

```
Disk drive to be tested (A/B)?
WARNING: DISK DATA WILL BE DESTROYED.
Insert a formatted scratch diskette in
selected drive and type any key.

Starting disk test, type any key to abort.
```

The error messages will be displayed as follows:

```
Pass #....                     Error Count = ...

SOFT ERROR ON DISK RESET:  Status = ...

HARD ERROR ON DISK RESET:  Status = ...

SOFT ERROR ON DISK WRITE:
   TRACK#...  SECTOR#...  STATUS = ...

HARD ERROR ON DISK WRITE:
   TRACK#...  SECTOR#...  STATUS = ...

SOFT ERROR ON DISK VERIFY:
   TRACK#...  SECTOR#...  STATUS = ...

HARD ERROR ON DISK VERIFY:
   TRACK#...  SECTOR#...  STATUS = ...
```

After completing a pass, the following END-OF-PASS message will be displayed.

```
*  PASS# ...    SOFT ERR COUNT = ...  HARD ERROR COUNT = ...
```

Table 7-2. Power Up And Extended Diagnostics With Possible Error Messages.

Diagnostic

Any read/write operation, if unsuccessful, is retried four times and the errors are considered as soft errors. If the error persists after four retries, it is considered a hard error. If a track has hard data or CRC errors, it is considered a bad track and discarded from further testing. On an error, a message will be displayed indicating the type of error, track # and sector #, and FDC status register. The cumulative error count will be incremented.

MEMORY TEST

On entering the memory test, a message is displayed: "Starting dynamic RAM test, type any key to abort."

The dynamic RAM is sized in 16K/64K increments and the following tests are performed on the entire memory:

1. Address Test:

   Address test within a 64K block is done using Dynamic RAM Test 1 in the power-up diagnostic section and then addressing across the blocks is checked by writing the block number into the last location of every block and then verifying it.

2. March Test:

   This test first fills up the entire memory with a background data pattern. Then, starting with the lowest address, it reads a location, compares it with background, writes a compliment of background there, goes to the next location, and continues the process till the highest address is reached. Then it waits for 100ms. and starts the same process, this time starting with the highest address and going towards the lowest. The test patterns used for background are 00,0FFH,55H,0AAH.

Table 7-2. Power Up And Extended Diagnostics With Possible Error Messages.

3. Galloping Pattern Test:

This test checks for read interaction between each location and every other location in the entire address range.

A background pattern will be written through-out the memory. Then, starting at the lowest address, a test word is written as the compliment of background. Memory is written as the compliment of background. Memory is read in all locations in the following sequence: background, test word, next background, test word, next background, etc. After reaching the last background location, the test word will be moved to the next sequential until the test word has been moved through every memory location.

Background patterns used will be 00,0FFH,55H,0AAH.

4. Galloping Write Recovery Test:

This test checks for write interactions by doing all possible writes followed by reads at different locations.

Again a background pattern is written throughout memory. Then, starting with the first location, every pair of addresses is checked in the following manner:

Read B (background) in loc(X) (location under test), write C (compliment of background) in loc(Y), read B in loc(X), write B in loc(Y), read B in loc(X), write C in loc(Y+1), read B in loc(X), etc.

After all locations have been checked in relation to loc(X), the sequence is repeated with respect to loc(X+1), etc.

Background patterns used will be 00,0FFH,55H,0AAH.

The above sequence of tests are repeated until a key is typed on the keyboard. Any errors will be displayed as the failing address, good data and bad data. A pass count and cumulative error count are displayed at the end of every pass.

Upon selection of Memory Test Diagnostics, the following messages will be displayed:

```
*  Starting dynamic RAM test, type any key to abort.
*
*  Memory Size = xxxxK
```

After completing a pass successfully, the following message will be displayed:

```
*  PASS # .....      ERROR COUNT = ....
```

On abort, control will be passed to the starting address of the monitor, to re-initialize the BIOS data area.

If errors occur, the error message will be displayed as follows:

```
DYNAMIC RAM ERROR AT xxxxxH

 GOOD DATA = ....    BAD DATA = ....
```

SYSTEM TEST (Z80 TEST)

The system test checks the swap logic and the Z80 processor. It verifies that the Z80 accesses all the memory and I/O. It consists of following tests:

1. Swap Logic Test:

   This test will display a message: "Testing Swap Logic" on the screen, swap 8088 to itself and then clear the screen. If 8088 loses control because of fault in the swap logic, the message will stay on the screen. "Swapping to Z80"

2. Z80 Test:

   This test sets up the Z80 mapping registers to start Z80 at the beginning of Z80 code in the diagnostic ROM, display a "Swap to Z80 failed" message on the screen and then swap to Z80.

   On getting control, Z80 first clears the last line from the screen to wipe out the error message and then proceeds to do memory and I/O tests.

   A short read/write test to dynamic RAM, video RAM and configuration RAM is performed to make sure that Z80 can access all the RAM.

Table 7-2. Power Up And Extended Diagnostics With Possible Error Messages.

SYSTEM TEST (Z80 TEST) CON'T

The Z80 mapping registers are tested by doing read/write test on the mapping registers as well as by mapping the Z80's higher address space into different RAM banks and verifying it by writing the bank number into the last location of every memory bank.

Z80 interrupt logic and I/O addressing are tested by generating interrupts from system timer, floppy disk controller and keyboard/printer UART.

Any errors detected are displayed on the screen and at the end of a pass, Z80 displays "Swap to 8088 failed" message on the screen and swaps control back to 8088. On getting control, 8088 erases the last line from the screen ("Swap to 8088 failed" message) and displays the pass count. Then the whole sequence of tests are repeated until any key on the keyboard is typed.

Upon selection of the System Test Diagnostics, the following message will be displayed.

```
*
*  Starting Z80 test, type any key to abort.
```

During testing, the following messages will be displayed on the screen:

```
*    TESTING SWAP LOGIC
*    SWAPPING TO Z80
*    SWAPPING TO 8088
*    PASS # ....  ERROR COUNT = ....
```

One or more of the following error messages will be displayed upon detecting the appropriate failure(s):

```
Z80 DYNAMIC RAM ERROR
Z80 VIDEO RAM ERROR
Z80 CONFIGURATION RAM ERROR
Z80 MAPPING REGISTER ERROR
Z80 INTERRUPT ERROR: TIMER
Z80 INTERRUPT ERROR: DISK
Z80 INTERRUPT ERROR: KEYBOARD
```

Table 7-2. Power Up And Extended Diagnostics With Possible Error Messages.

DISPLAY CONFIGURATION

Selecting display Configuration from the menu causes the computer system configuration to be displayed. The display will be similar to the following:

1. MODEL 3000x
2. SYSTEM RAM - xxxK
3. CONFIGURATION RAM - xxxK
4. DISK DRIVES = 0, 1, 2 or 3
5. ROM# - Rev#
   ROM# - Rev#
   ROM# - Rev#
   etc. etc.
   ROM# - Rev#
6. SERIAL COMMUNICATION

Table 7-2. Power Up And Extended Diagnostics With Possible Error Messages.

FIELD DIAGNOSTICS

INTRODUCTION

The Field Service Diagnostics are a collection of tests to exercise standard and optional components of the system. These Diagnostics are invoked by inserting the Field Service Diagnostic disk into Drive A, and loading from Drive A. (Field Service Diagnostics can also be invoked from Drive B.) Once the system is booted, the diagnostic executive takes control. The diagnostic executive runs under MS-DOS, and utilizes MS-DOS for loading files. This, however, is transparent to the user.

Before running Field Service Diagnostics, the system should have passed the power-up diagnostics and the extended diagnostics, particularly the floppy disk portion of the extended diagnostics. If the disk portion of the extended diagnostics fails, the disk is corrupted and should not be used.

Each of the diagnostic programs test a particular subsystem Main Menu is displayed on the screen.

```
Computer Devices DOT Diagnostic Diskette. Vers. 1.0

**************************************************************************


                    F1 - Run Short Test Sequence

                    F2 - Run Long Test Sequence

                    F3 - Select an Individual Test

                    F10 - Help


**************************************************************************
```

If option F1 is selected the Short Test Sequence will execute. The Short Test Sequence consists of the following tests:

Disk System Test

Main Memory Test

Configuration Memory Test

Please note that these tests are automatic and involve no user intervention.

Table 7-3. C/S Disk Diagnostics (Sheet 1 of 3).

If option F2 is selected the Long Test Sequence will executive automatically. The Long Test Sequence consists of the following tests:

Disk System Test

Main Memory Test

Configuration Memory Test

Interrupt System Test

Clock/Calendar Test (not yet implemented).

Keyboard Test (Buffer Test and Self Test Check only)

NOTE: All diagnostics executed individually obey the following commands:

- ALT + FUNCTION key will loop a best endlessly until the user hits CNTRL-C.
- SHIFT + FUNCTION key loops a test and prints any errors.
- CONTROL + FUNCTION key will output test results to the printer and screen.

If option F3 is selected the following Individual Test Menu appears on the screen:

```
    Computer Devices DOT Diagnostic Diskette.  Vers. 1.0

F1 -- Printer Test

F2 -- Main Memory Test

F3 -- Configuration Memory Test

F4 -- Interrupt System Test

F5 -- Video Display System Test

F6 -- Clock/Calendar Test

F7 -- Z80 System Test

F8 -- Keyboard Test

F9 -- FOR MORE TESTS

F10 -- HELP
```

Table 7-3. C/S Disk Diagnostics (Sheet 2 of 3).

If option F9 -- More Tests is selected the following additional menu will appear on the screen:

F1 -- Printer Test

F2 -- Communications System Test

F3 -- Numeric Processor Test

F4 -- Monitor Alignment Pattern

F5 -- Disk Interchangeability Test

F6 -- System Interaction Test

F7 -- Z80 System Interaction Test

F9 -- RESTART THE SELECTIONS

F10 -- HELP

The following tests are not described in this documentation:

Clock/Calendar Tests

Numeric Processor Test

Z80 Systems and Interactions Tests

NOTE

A complete description of each C/S field diagnostic test is contained in a separate Computer Devices document. (Field Service Diagnostics for the Personal Computer, Part Number 0008-14823.) Contact Customer Service for information.

Table 7-3. C/S Disk Diagnostics (Sheet 3 of 3)

SECTION VIII

SUPPLEMENTARY INFORMATION

8-1. GENERAL.

8-2. This section includes supplemental information to aid the service person in the operation, installation, and maintenance of the Computer and the assemblies thereof.

8-3 TECHNICAL MANUAL CONVENTIONS

8-4 The following defines the conventions used in describing procedures and operations in this service manual.

Underlined = operator entry

[RETN] = Press key labeled with

[CTRL-X] = Hold down CTRL and press x or other key command

LOAD FROM DISK A = computer display

POWER switch "ON" = Panel and circuit board controls

MS/DOS SPECIAL EDITING AND FUNCTION KEYS

[CAPS LOCK] = To make letters all capitals

[BACK SPACE] = to move cursor one space to the left deleting letter or symbol in space

[SHIFT-PAPER LF] = to advance paper on line

[ALT-PAPER LF] = form feed (6 lines)

[SHIFT - PRT SCRN] = to print display

[CTRL - ALT - CLR] = to reset Computer (Main Menu)

[CTRL-P] = to print out directly from keyboard and display

[CTRL-N] = to stop print out feature

[CTRL-C] = to abort current command. Returns Computer to A: prompt.

[CTRL-H] = Same as BACKSPACE.

[CTRL-M] = to carriage return.

[CTRL-S] = to suspend display of output to terminal screen. Pressing any key resumes scrolling.

[CTRL-X] = to void current input (same as F6)

[DEL] = to skip over a character in the Video Display line

[F1] = to copy one character from the Video Display line to the command line.

[F2] = to copy all characters up to the character specified from the Video Display line to the command line.

[F3] = to copy remaining characters in the Video Display line up to the command line.

[F4] = to skip over the characters in the Video Display line up to the character specified.

[F5] = to make the new line the new Video Display line

[F6] = to void the current input; leaves the Video Display line unchanged.

Table 8-1. Special Editing And Function Keys (Sheet 1 of 3).

[PAPER LF] = to move cursor to next line.

[RETN] = Carriage return; places current line in edit buffer (template).

[TAB] = to move cursor to next tab stop.

CAUTION

ALWAYS WAIT UNTIL THE DISK DRIVE LAMP GOES OFF BEFORE REMOVING DISKS FROM THE DRIVE.

A:FORMAT [RETN] = to format program disk on Drive A

A:COPY *.* B: [RETN] = to copy from Drive A to Drive B (Two drive instrument

A:DIR B: = to list B directory

A:B:[RETN] = to use B drive

A:TYPE "PROGRAM NAME" [RETN] = to run program data

NOTE

Press any key to stop the extended diagnostic program. Press [ALT-ESC] after entering SETCMOS to display the configuration chart.

A:DISKCOPY [RETN] = To copy a disk on a single drive instrument (no formatting required)

A:DISKCOPY A: B: = To copy a disk from A drive to B drive (no formatting required)

MULTIPLAN SPECIAL FUNCTION KEYS

[CTRL-C] = Aborts current command. Returns MULTIPLAN to command level.

[CTRL-D] = Moves cell pointer right.

[CTRL-E] = Moves cell pointer up.

[CTRL-H] = Backspaces edit cursor.

[CTRL-M] = Carriage return, enters current command into edit buffer (template).

[CTRL-Q] = HOME key.

[CTRL-S] = Moves cell pointer left.

Table 8-1. Special Editing and Function Keys (Sheet 2 of 3).

MULTIPLAN SPECIAL FUNCTION KEYS (CON'T)

[CTRL-X] = Moves cell pointer down.

[ESC] = Aborts current command.

[NUM LOCK] = Enables and disables numeric keypad (toggle).

[RETN] = Carriage return; enters current command into edit buffer (template).

[SHIFT-PRT SCRN] = Echoes terminal output to printer.

[SHIFT-?] = Enters MULTIPLAN "help" function.

[SPACE BAR] = Advances edit cursor (selects next field on command line).

[TAB] = Advances edit cursor (selects next field on command line).

[@] = REFERENCE KEY - changes relative to absolute addresses immediately after direction key is depressed.

[!] = Causes one-time calculation; replaces a formula with its value after the formula is entered.

[:] = Range operator used with absolute address

[CTRL-F] = Moves Edit cursor to the next unlocked cell.

[CTRL-K] = Moves Edit cursor one character left when editing responses in command fields.

[CTRL-L] = Moves Edit cursor one character right when editing responses in command fields.

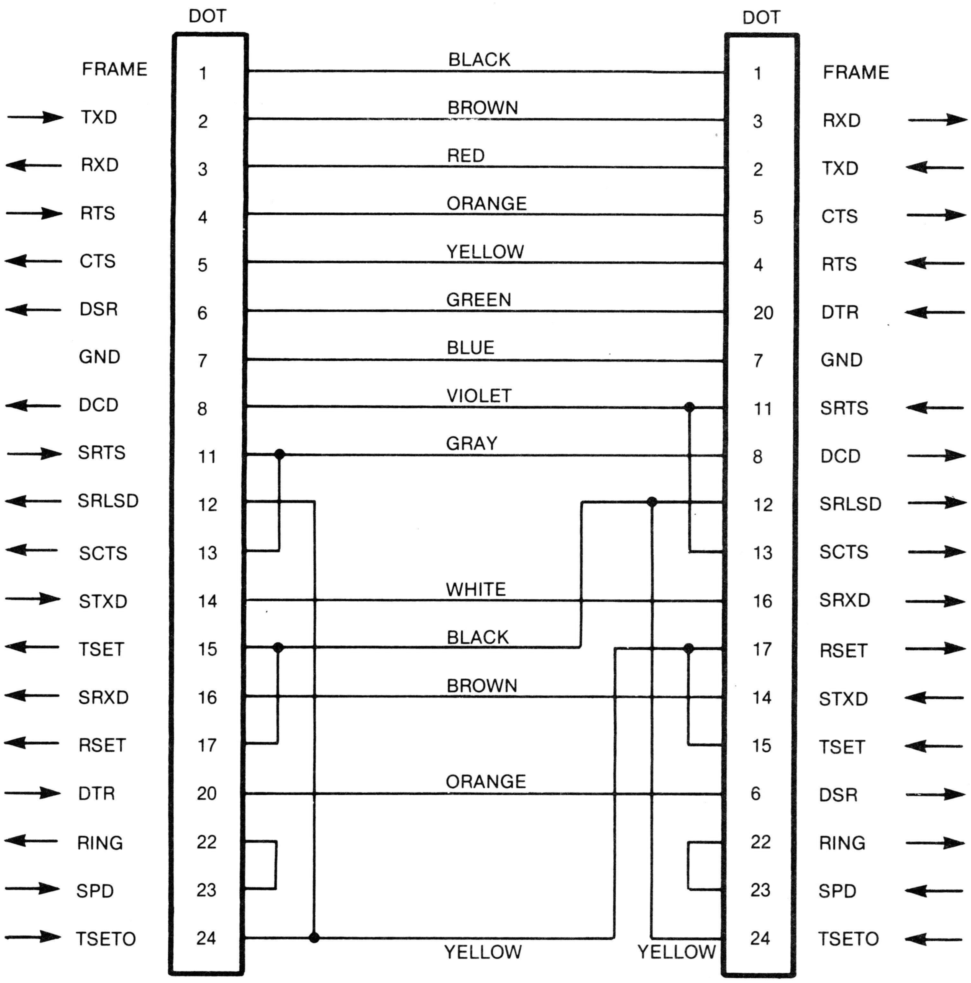
[CTRL-O] = Moves Edit cursor one word to the left of the current word when editing responses in command field.

[CTRL-P] = Moves Edit cursor one word to the right of the current word when editing responses in command field.

[CTRL-Y] = Deletes character(s) highlighted by edit cursor.

[CTRL-I] = Advances edit cursor (selects next field on command line).

Table 8-1. Special Editing And Function Keys (Sheet 3 of 3).


DOT
DOT
FRAME
TXD
RXD
RTS
CTS
DSR
GND
DCD
SRTS
SRLSD
SCTS
STXD
TSET
SRXD
RSET
DTR
RING
SPD
TSETO
1
2
3
4
5
6
7
8
11
12
13
14
15
16
17
20
22
23
24
BLACK
BROWN
RED
ORANGE
YELLOW
GREEN
BLUE
VIOLET
GRAY
WHITE
BLACK
BROWN
ORANGE
YELLOW
YELLOW
1
3
2
5
4
20
7
11
8
12
13
16
17
14
15
6
22
23
24
FRAME
RXD
TXD
CTS
RTS
DTR
GND
SRTS
DCD
SRLSD
SCTS
SRXD
RSET
STXD
TSET
DSR
RING
SPD
TSETO

FOR COMMUNICATION TEST IN C/S DIAGNOSTIC

Figure 8-1. C/S Communication Test Diagnostic Loopback Cable.

CIRCUIT FUNCTION, LSI CIRCUITS

LSI CIRCUIT	REFERENCE DESIGNATION	CIRCUIT FUNCTION
I/O Mother Bd Assembly, A9A2A1		
8253	Z47	Programmable Interval Timer (PIT)
8255A	Z38	Programmable Peripheral Interface (PPI)
8251A	Z50	Universal Synchronous/Asynchronous Receiver/Transmitter (USART)
8274 (7201)	Z51	Serial Communications Controller (MPSC)
8237	Z31	DMA Controller
UPD 765	Z3	Floppy Diskette Controller
74LS670	Z26	Dual Port RAM Register
Z80B	Z19	Central Processor Unit (I/O)
MM58174	Z37	Real Time/Calendar Clock
DRAM/ROM Board Assembly, A5		
6116 or 8K X 8	Z6	
8288	Z53	Buss Controller
2764	Z37	ROM
2764	Z31	ROM
2764	Z17	ROM
2764	Z5	ROM
8088	Z45	Central Processor Unit
8087	Z26	Numeric Data Processor
2764	Z38	ROM
2764	Z32	ROM
2764	Z18	ROM
8284	Z52	Clock/Calendar Generator

Table 8-2. Circuit Functions, LSI Circuits (Sheet 1 of 2).

LSI CIRCUIT	REFERENCE DESIGNATION	CIRCUIT FUNCTION
CRT Controller Board Assembly, A6		
68B45S	Z29	CRT Controller
8259	Z?	Programmable Interrupt Controller (PIC)
2764	Z?	Character Generator
Printer Control Board Assembly, A7A1		
8031	Z17	Microprocessor
Keyboard Assembly, A2A1		
8251	Z1	Keyboard Controller

Table 8-2. Circuit Functions, LSI Circuits (Sheet 2 of 2).

CONNECTOR PINOUTS

DRAM/ROM BOARD ASSEMBLY

P1(J1)

PIN	
1	GND
2	I/OPRTYERR
3	XRESET
4	XD7
5	+5VDC
6	XD6
7	POWER GOOD +5VDC ±10%
8	XD5
9	NC UNUSED
10	XD4
11	NC
12	XD3
13	NC
14	XD2
15	XNMI
16	XD1
17	NC
18	XD0
19	GND
20	NC
21	XMEMW
22	NC
23	XMEMR
24	XA19
25	XIOW
26	XA18
27	XIOR
28	XA17
29	NC
30	XA16
31	NC
32	XA15
33	XINTA
34	XA14
35	XINT
36	XA13
37	RFSHACK
38	XA12
39	XCLK
40	XA11
41	VCC STDBY
42	XA10
43	IRQ7

CRT CONTROLLER BOARD ASSEMBLY

P1(J1)

PIN	
1	GNP
2	I/OPRTYERR
3	XRESET
4	XD7
5	+5VDC
6	XD6
7	NC
8	XD5
9	NC
10	XD4
11	NC
12	XD3
13	NC
14	XD2
15	NC
16	XD1
17	NC
18	XD0
19	GND
20	I/O CH RDY
21	XMEMW
22	XENA
23	XMEMR
24	XA19
25	XIOW
26	XA18
27	XIOR
28	XA17
29	NC
30	XA16
31	NC
32	XA15
33	NC
34	XA14
35	NC
36	XA13
37	NC
38	XA12
39	XCLK
40	XA11
41	NC
42	XA10
43	NC

Table 8-3. Connector Pinouts (Sheet 1 of 15).

CONNECTOR PINOUTS

DRAM/ROM BOARD ASSEMBLY (Con't)

P1(J1)	PIN	
	44	XA9
	45	NC
	46	XA8
	47	NC
	48	XA7
	49	NC
	50	XA6
	51	NC
	52	XA5
	53	NC
	54	XA4
	55	XALE
	56	XA3
	57	+5VDC
	58	XA2
	59	XOSC
	60	XA1
	61	GND
	62	XA0
	63	XPCLK
	64	CLRPRTYEERR
	65	NC
	66	88IDLE
	67	88ENA
	68	88HLDWAIT
	69	NC
	70	88WAIT
	71	NC
	72	GND

CRT CONTROLLER BOARD ASSEMBLY (Con't

P1(J1)	PIN	
	44	XA9
	45	NC
	46	XA8
	47	NC
	48	XA7
	49	NC
	50	XA6
	51	NC
	52	XA5
	53	NC
	54	XA4
	55	NC
	56	XA3
	57	+5VDC
	58	XA2
	59	NC
	60	XA1
	61	GND
	62	XA0
	63	NC
	64	INT.HSYNC
	65	NC
	66	INT.VSYNC
	67	EXT.HSYNC
	68	INT. VIDEO
	69	EXT.VSYNC
	70	NC
	71	EXT. VIDEO
	72	GND

Table 8-3. Connector Pinouts (Sheet 2 of 15).

PRINTER CONTROL BOARD

J1	PIN	
	1	To J3, Pin 1 (Sense 1) and Pin 2 (Sense 2) (+13.5V ADJ)
	2	To J3, Pin 3 (-Sense) (POWER RETURN)
	3	+5VDC
	4	LOG GND (+5V RETURN)
	5	NC
	6	+17VDC
	7	PWR GND (POWER RETURN)
	8	+13.5VDC
	9	PWR GND (POWER RETURN)
	10	+5VDC MOTORS

J2	PIN
1	Power Ground
2	TXD
3	RESET
4	RXD (Not Used)
5	RXD (MAIN)

J3	PIN
1	SENSE 1
2	SENSE 2
3	Sense Return (-)
4	+13.5 VDC
5	DOT 1 (Printhead)
6	DOT 2 (Printhead)
7	DOT 3 (Printhead)
8	DOT 4 (Printhead)
9	DOT 5 (Printhead)
10	DOT 6 (Printhead)
11	DOT 7 (Printhead)
12	DOT 8 (Printhead)
13	DOT 9 (Printhead)
14	DOT 10 (Printhead)
15	DOT 11 (Printhead)
16	+13.5 VDC

J4	PIN
1	ENCODER
2	SOLENOID DRIVE
3	NC
4	SOLENOID
5	LF01
6	LF02
7	LFCOM1
8	CR01
9	CR02
10	CRCOM1
11	HOME
12	SENSOR RETURN
13	PAPEROUT
14	SOLENOID RETURN
15	LF03
16	LF04
17	LFCOM2
18	CR03
19	CR04
20	CRCOM2

Table 8-3. Connector Pinouts (Sheet 3 of 15).

POWER SUPPLY ASSEMBLY

J1	PIN	(Piggyback Assembly) Mates with J5
	1	-12VDC
	2	+5VDC
	3	NC
	4	+12VDC
	5	+2.5 REG
	6	VB
	7	VA
	8	NC
	9	Power Good (In)
	10	Power Ground
	11	NC
	12	NC
	13	Power Good (Out)
	14	VAUX

J2	PIN	(Main Board)
	1	13.5V ADJ
	2	13.5VADJ RETURN
	3	+5VDC
	4	GND (Power)
	5	NC
	6	+17VDC
	7	PRINTER GND
	8	13.5VDC
	9	PRINTER GND
	10	+4.5VDC

J3	PIN	
	1	GND
	2	+12VDC
	3	NC
	4	+12VDC
	5	+12VDC
	6	+12VDC
	7	-12VDC
	8	GND
	9	+5VDC
	10	+5VDC
	11	POWER GOOD
	12	GND
	13	+13.5VDC
	14	PRINTER GND

J4	PIN	
	1	PRINTER GND
	2	+13.5 VDC
	3	CHASSIS GND
	4	NC
	5	115/240 VAC IN
	6	NC
	7	115/240 VAC IN

J5	PIN	
	1	-12VDC
	2	+5VDC
	3	NC
	4	+12VDC
	5	+2.5 REG
	6	VB
	7	VA
	8	NC
	9	POWER GOOD
	10	POWER GROUND
	11	NC
	12	NC
	13	POWER GOOD
	14	VAUX

Table 8-3. Connector Pinouts (Sheet 4 of 15).

BUS INTERFACE (I/O MOTHER BOARD ASSEMBLY)

Four Bus Connectors are located on the I/O Mother Board Assembly. One card slot is dedicated to the DRAM/ROM Board Assembly, the second is dedicated to the CRT Controller Board Assembly and the last two are available for optional assemblies.

MNEMONIC	DESCRIPTION
XA1-XA19	Address Lines
CDO-XD1	Data lines
IRQ4-IRQ7	Unassigned Interrupt Lines
XMEMR	Memory Read
XMEMW	Memory Write
XIOR	I/O Read
XIOW	I/O Write
RFSHACK	Refresh Signal to Dynamic RAMs
XINT	Maskable Interrupt Line From Interrupt Controller to CPU's
XINTA	Tri-State Int Acknowledge from Active Processor
XCLR	4.9152 MHz Clock, 33% Duty Cycle
XOSC	14.7456 MHz Clock, 50% Duty Cycle
VCCSTDBY	2.8V-3.6V Battery Backup
POWERGOOD	+5V Power Supply is +5V ± 10%
XNMI	Non Maskable Interrupt To Processors
I/O CHRDY	External Wait Stat Request Line for Slow I/O
XRESET	System Reset
EOP	End of Process; From DMA Controller
XALE	Address Latch Enable; Latch Signal Generated by 8088
DREQ2	
DACK2	Unassigned DMA Channels
DREQ3	
DACK3	
XENA	When High, DMA Controller has the Bus
I/O PRTYERR	System Parity Error, other than 8088 DRAM

Table 8-3. Connector Pinouts (Sheet 5 of 15).

I/O MOTHER BOARD ASSEMBLY CONNECTORS J4 AND J5

I/OPRTYERR	2	1	GND
XD7	4	3	XRESET
XD6	6	5	TSVDC
XD5	8	7	POWER GOOD
XD4	10	9	UNUSED
XD3	12	11	DREQ 2
XD2	14	13	-12VDC
XD1	16	15	XNMI
XD0	18	17	+12VDC
I/O CHRPY	20	19	GND
XENA	22	21	XMEMW
XA19	24	23	XMEMR
XA18	26	25	XIOW
XA17	28	27	XIOR
XA16	30	29	DACK 3
XA15	32	31	DREQ 3
XA14	34	33	XINTA
XA13	36	35	XINT
XA12	38	37	RFSHACK
XA11	40	39	XCLK
XA10	42	41	VCC STDBY
XA9	44	43	IRQ7
XA8	46	45	IRQ6
XA7	48	47	IRQ5
XA6	50	49	IRQ4
XA5	52	51	DACK 2
XA4	54	53	EOP
XA3	56	55	XALE
XA2	58	57	+5VDC
XA1	60	59	XOSC
XA0	62	61	GND
CLRPRTYERR	64	63	XPCLK
88 IDLE	66	65	ALTPROCHOLDA
88 HOLDWAIT	68	67	88ENA
88 WAIT	70	69	CENDISA
GND	72	71	ALTPROCENA

Table 8-3. Connector Pinouts (Sheet 6 of 15).

I/O MOTHER BOARD ASSEMBLY J3

I/OPRTYERR	2	1	GND
XD7	4	3	XRESET
XD6	6	5	TSVDC
XD5	8	7	POWER GOOD
XD4	10	9	UNUSED
XD3	12	11	DREQ 2
XD2	14	13	-12VDC
XD1	16	15	XNMI
XD0	18	17	+12VDC
I/O CHRDY	20	19	GND
XENA	22	21	XMEMW
XA19	24	23	XMEMR
XA18	26	25	XIOW
XA17	28	27	XIOR
XA16	30	29	DACK 3
XA15	32	31	DREQ 3
XA14	34	33	XINTA
XA13	36	35	XINT
XA12	38	37	RFSHACK
XA11	40	39	XCLK
XA10	42	41	VCC STDBY
XA9	44	43	IRQ7
XA8	46	45	IRQ6
XA7	48	47	IRQ5
XA6	50	49	IRQ4
XA5	52	51	DACK 2
XA4	54	53	EOP
XA3	56	55	XALE
XA2	58	57	+5VDC
XA1	60	59	XOSC
XA0	62	61	GND
INT H SYNC	64	63	XPCLK
INT V SYNC	66	65	ALTPROCHOLDA
INT VIDEO	68	67	EXT V SYNC
88 WAIT	70	71	EXT V SYNC
GND	72	71	EXT VIDEO

Table 8-3. Connector Pinouts (Sheet 7 of 15).

I/O MOTHER BOARD ASSEMBLY J2 AND J10

I/OPRTYERR	2	1	GND
XD7	4	3	XRESET
XD6	6	5	+5VDC
XD5	8	7	POWER GOOD
XD4	10	9	UNUSED
XD3	12	11	DREQ2
XD2	14	13	-12VDC
XD1	16	15	XNMI
XD0	18	17	+12VDC
I/O CHRDY	20	19	GND
XENA	22	21	XMEMW
XA19	24	23	XMEMR
XA18	26	25	XIOW
XA17	28	27	XIOR
XA16	30	29	DACK3
XA15	32	31	DREQ3
XA14	34	33	XINTA
XA13	36	35	XINT
XA12	38	37	RFSHACK
XA11	40	39	XCLK
XA10	42	41	VCC STDBY
XA9	44	43	IRQ7
XA8	46	45	IRQ6
XA7	48	47	IRQ5
XA6	50	49	IRQ4
XA5	52	51	DACK2
XA4	54	53	EOP
XA3	56	55	XALE
XA2	58	57	+5VDC
XA1	60	59	XDSC
XA0	62	61	GND

Table 8-3. Connector Pinouts (Sheet 8 of 15).

The following is a description of the nmemonics of the bus on the I/O Mother board Assembly. All signal lines are TTL compatible.

SIGNAL	I/O	DESCRIPTION
XDSC	O	Oscillator: This signal is a high speed clock with a 67 nsec. period (14.73 MHz.) It has a 50% duty cycle.
XPCLK	O	Clock: This is the system clock which is the oscillator output divided-by-three and has a period of 203 nsec (4.91 MHz). The clock has a 33% duty cycle.
XRESET	O	Reset: This line is used to reset or initialize system logic upon power-up or during a low line voltage outage. This signal is synchronized to the falling edge of clock and is active HIGH.
A0-A19	O	Address Bits 0 to 19: These lines are used to address memory and I/O devices within the system. The 20 address lines allow access of up to 1 megabyte of memory. A0 is the Least Significant Bit (LSB) while A19 is the Most Significant Bit (MSB). These lines are generated by either the processor or the DMA Controller. They are active HIGH.
ALE	O	Address Latch Enable: This is provided by the 8288 Bus Controller and is used on the System Board to latch valid addresses from the processor. It is available to the I/O Channel as an indicator of a valid processor address (when used in conjunction with AEN). Processor addresses are latched with the falling edge of ALE.
I/O PRTYERR	I	I/O Parity Error: This line provides the CPU with parity (error) information on memory or devices in the I/O Channel. When this signal is active LOW, a parity error is indicated.
I/O CH RDY	I	I/O Channel Ready: This line (normally high or "READY") is pulled low ("NOT READY") by a memory or I/O device to lengthen I/O or memory cycles. It allows slower devices to attach to the I/O Channel with a minimum of difficulty. Any slow device using this line should drive it low immediately upon detecting a valid address and a Read or Write command. This line should never be held low for any period in excess of 10 clock cycles (2.1 usec.) Machine cycles (I/O or memory) are extended by an integral number of CLK cycles (210ns).

Table 8-3. Connector Pinouts (Sheet 9 of 15).

SIGNAL	I/O	DESCRIPTION
IRQ2-IRQ7	I	Interrupt Request 2 to 7: These lines are used to signal the processor that an I/O device requires attention. They are prioritized with IRQ2 as the highest priority and IRQ7 as the lowest. An Interrupt Request is generated by raising an IRQ line (Low to High) and holding it high until it is acknowledged by the processor (Interrupt Service Routine).
IOR	O	I/O Read Command: This command line instructs an I/O device to drive its data onto the data bus. It can be driven by the processor or the DMA Controller. This signal is active LOW.
IOW	O	I/O Write Command: This command line instructs an I/O device to read the data on the data bus. It can be driven by the processor or the DMA controller. This signal is active LOW.
MEMR	O	Memory Read Command: This command line instructs the memory to drive its data onto the data bus. It can be driven by the processor or the DMA Controller. This signal is active LOW.
MEMW	O	Memory Write Command: This command line instructs the memory to store the data present on the data bus. It can be driven by the processor or the DMA Controller. This signal is active LOW.
DRQ1-DRQ3	I	DMA Request 1 to 3: These lines are asynchronous channel requests used by peripheral devices to gain DMA service. They are prioritized with the DRQ1 having highest priority and DRQ3 the lowest. A DRQ line must be held high until the corresponding DACK line goes active.
DACK2 DACK3	O	DMA Acknowledge 2 to 3: These lines are used to acknowledge DMA requests (DRQ2-DRQ3) and to refresh system dynamic memory (DACK0). They are active LOW.
AEN	O	Address Enable: This line is used to delegate the processor and other devices from the I/O Channel to allow Direct Memory Access (DMA) transfers to take place. When this line is active (HIGH), the DMA Controller has control of the address bus, data bus, read command lines (memory and I/O), and the write command lines (memory and I/O).
EOP	O	End of Process: This line provides a pulse when the terminal count for any DMA channel is reached. This signal is active HIGH.

Table 8-3. Connector Pinouts (Sheet 10 of 15).

SIGNAL	I/O	DESCRIPTION
CLRPRTYERR	I	Clear Parity Error: This line supplies the CPU the signal to clear parity (error) information latch on memory or devices. This signal is active low.
88 IDLE	O	88 IDLE: 8088 bus interface unit is in idle state.
88 HOLDWAIT	O	88 HOLDWAIT: Alternate bus master wants the bus.
ALT PROC HOLD A	I	ALT PROCESSOR HOLD A: This command puts the alternate processor in the hold mode - unused signal line.
88ENA	O	88 Enable Address Buffer: Enables the address buffers.
CENDISA	O	Command Enable/Disable: Disable the command lines.
ALTPROCENA	O	Alternate Processor Enable: Enables external processor (unused signal line).
INT H SYNC	O	Integral Video Monitor Horizontal Synch
INT V SYNC	O	Integral Video Monitor Vertical Sync
INT VIDEO	O	Integral Video Monitor Data Line.
EXT H SYNC	O	External Video Monitor Horizontal Sync
EXT V SYNC	O	External Video Monitor Vertical Sync
EXT VIDEO	O	External Video Monitor Data Line

Table 8-3. Connector Pinouts (Sheet 11 of 15).

The following is a description of the CRT Controller Board Assembly Signal Lines

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND - 0 Volts	2	I/0 PRTYERR - Parity Error
3	XRESET - Processor Reset	4	XD7 - Processor Data Bit 7
5	+5VDC (Vcc)	6	XC6 - Processor Data Bit 6
7	POWERGOOD - Unassigned	8	XD5 - Processor Data Bit 5
9	-5VDC	10	XD4 - Processor Data Bit 4
11	DREQ2 - Unassigned	12	XD3 - Processor Data Bit 3
13	-12VDC	14	XD2 - Processor Data Bit 2
15	XNMI - Unassigned	16	XD1 - Processor Data Bit 1
17	+12VDC	18	XD0 - Processor Data Bit 0
19	GND - 0 Volts	20	I/OCHRDY - EXT wait state request
21	XMEMW - Processor memory Write	22	XENA - Processor Enable
23	XMEMR - Processor Memory Read	24	XA19 - Processor Address Bit 19
25	XIOW - Processor I/O Write	26	XA18 - Processor Address Bit 18
27	XIOR - Processor I/O Read	28	XA17 - Processor Address Bit 17
29	DACK3 - Unassigned	30	XA16 - Processor Address Bit 16
31	DREQ3 - Unassigned	32	XA15 - Processor Address Bit 15
33	XINTA - Unassigned	34	XA14 - Processor Address Bit 14
35	XINT - Unassigned	36	XA13 - Processor Address Bit 13
37	RFSHACK - Unassigned	38	XA12 - Processor Address Bit 12
39	XCLK - Processor Clock	40	XA11 - Processor Address Bit 11
41	VCCSTBY - Unassigned	42	XA10 - Processor Address Bit 10
43	IRQ7 - Unassigned	44	XA9 - Processor Address Bit 9
45	IRQ6 - Unassigned	46	XA8 - Processor Address Bit 8
47	IRQ5 - Unassigned	48	XA7 - Processor Address Bit 7
49	IRQ4 - Unassigned	50	XA6 - Processor Address Bit 6
51	DACK2 - Unassigned	52	XA5 - Processor Address Bit 5
53	EOP - Unassigned	54	XA4 - Processor Address Bit 4
55	XALE - Unassigned	56	XA3 - Processor Address Bit 3
57	+5VDC	58	XA2 - Processor Address Bit 2
59	XOSC - Unassigned	60	XA1 - Processor Address Bit 1
61	GND - 0 Volts	62	XA0 - Processor Address Bit 0
63	XPCLK - Unassigned	64	INT HSYNC - Internal Video Display Control
65	No Connection	66	INT VSYNC - Internal Video Display Control
67	EXT HSYNC - External Video Display Control	68	INT VSYNC - Internal Video Display Control
69	EXT VSYNC - External Video Display Control	70	88 WAIT - Unassigned
71	EXT VIDEO - External Video Display Control	72	GND - 0 Volts

Table 8-3. Connector Pinouts (Sheet 12 of 15).

The following is a description of the DRAM/ROM Board Assembly Signal Lines

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND - 0 Volts	2	I/O PRTYERR - Parity Error other than 8088
3	XRESET - System Reset	4	XD7 - Data Bit 7
5	+5VDC (Vcc)	6	XD6 - Data Bit 6
7	POWERGOOD - Vcc equals +5VDC ±10%	8	XD5 - Data Bit 5
9	-5VDC	10	XD4 - Data Bit 4
11	DREQ2 - Unassigned DMA Channel Line 2 (Request 2)	12	XD3 - Data Bit 3
13	-12VDC	14	XD2 - Data Bit 2
15	XNMI - Processor non-maskable Interrupt	16	XD1 - Data Bit 1
17	+12VDC	18	XD0 - Data Bit 0
19	GND - 0 Volts	20	I/OCHRDY - External wait state request line for slow I/O
21	XMEMW - Processor memory write	22	XENA - When high DMA Controller has bus (Processor enable)
23	XMEMR - Processor memory read	24	XA19 - Address bit 19
25	XIOW - Processor I/O write	26	XA18 - Address bit 18
27	XIOR - Processor I/O Read	28	XA17 - Address bit 17
29	DACK3 - Unassigned DMA Channel 3 (Acknowlege 3)	30	XA16 - Address bit 16
31	DREQ3 - Unassigned DMA Channel line 3 (Request 3)	32	XA15 - Address bit 15
33	XINTA - Processor Interrupt Acknowlegement	34	XA14 - Address bit 14
35	XINT Processor Interrupt From Controller to CPU's	36	XA13 - Address bit 13
37	RFSHACK - Refresh Acknowlege to Dynamic RAM's	38	XA12 - Address bit 12
39	XCLK - Processor clock (4.9152 MHz 33% duty cycle)	40	XA11 - Address bit 11
41	VCCSTBY - Stand by supply for configuration control RAM (Battery backup)	42	XA10 - Address bit 10
43	IRQ7 - Unassigned Interrupt Line 7	44	XA9 - Address bit 9
45	IRQ6 - Unassigned interrupt Line 6	46	XA8 - Address bit 8
47	IRQ5 - Unassigned Interrupt Line 5	48	XA7 - Address bit 7
49	IRQ4 - Unassigned Interrupt Line 4	50	XA6 - Address bit 6
51	DACK2 - DMA Channel 2 (Acknowledge) unassigned	52	XA5 - Address bit 5
53	EOP - DMA End of process signal	54	XA4 - Address bit 4
55	XALE - Address latch enable, latch signal generated by 8088	56	XA3 - Address bit 3
57	+5VDC	58	XA2 - Address bit 2

Table 8-3. Connector Pinouts (Sheet 13 of 15).

PIN	DESCRIPTION (Con't)	PIN	DESCRIPTION (Con't)
59	XOSC - 14.7456 MHz, 50% duty cycle	60	XA1 - Address bit 1
61	GND - 0 Volts	62	XA0 - Address bit 0
63	XPCLK - Peripheral clock (2.4576 MHz)	64	CLRPRTYERR - Clear parity error latch
65	ALTPROCOLDA - Puts alternate processor in hold mode (unused)	66	88IDLE - 8088 Bus interface unit is idle
67	88ENA - 8088 board address buffer enable	68	88 HOLD WAIT - Alternate bus master wants bus
69	CENDISA - Disable 8288 Command Lines	70	88 WAIT - I/O Operation with 8088 in control
71	ALTPROCENA - Alternate Processor Enable (unused)	72	GND - 0 Volts

Integral Printer Connector - J8

PIN	DESCRIPTION
1	GND
2	PTR IN - Receive Data from Printer
3	PTRRESET - Reset Printer
4	PTR OUT - Transmit Data to Printer
5	NC

Video Potentiometers - J11

1, 3, 4	Contrast Control
5, 6, 7	Brightness Control
2	NC

Disk Drive Signal Connector -J13

PIN	DESCRIPTION	PIN	DESCRIPTION	
1	MOTOR ON (output)	2	SELECT 0 - Select Drive A	(Output)
3	DSK CHG	4	SELECT 1 - Select Drive B	(Output)
5	DSK RST	6	DIRTN - Direction Select	(Output)
7	RETURN	8	STEP - Step Selected Drive	(Output)
9	RETURN	10	WRTDATA - Write Data	(Output)
11	RETURN	12	WRTGATE - Write Gate	(Output)
13	RETURN	14	HDLOAD - Load Selected Head	(Output)
15	RETURN	16	SIDE SEL	(Output)
17	RETURN	18	INDEX - Index Drive	(Input)
19	RETURN	20	TRK00 - Selected Drive Track 00	(Input)
21	RETURN	22	WRTPRT - Write Protect	(Input)
23	RETURN	24	RDDATA - Read Data	(Input)
25	RETURN	26	READY - Selected Drive Ready	(Input)

Table 8-3. Connector Pinouts (Sheet 14 of 15).

Disk Drive Power Connector - J15A and J15B

PIN	NMEMONICS	DESCRIPTION
1	+5 VDC	+5 VDC Supply to Disk Drive A
2	LOG GND	Logic Ground Return for Disk Drive A
3	LOG GND	+12 VDC Ground Return for Disk Drive A
4	+12 VDC DISK A	+12 VDC Supply for Disk Drive A
5	+12 VDC DISK B	+12 VDC Supply for Disk Drive B
6	LOG GND	+12 VDC Ground Return for Disk Drive B
7	LOG GND	Logic Ground Return for Disk Drive B
8	+5 VDC	+5 VDC Supply to Disk Drive B

CRT Signal and Power Connector - J16

PIN	NMEMONICS	DESCRIPTION	
1	CRT GND	CRT Supply Return	
2		To J11-5	
3		To J11-6	CONTRAST CONTROL
4		To J11-7	
5	NC		
6	INT HSYNC	Integral Video HSync	
7	+12 VDC CRT	+12 VDC Supply to CRT	
8		To J11-3 (Video)	
9	INT VSYNC	Integral Video VSync	
10	CRT GND	CRT Supply Return	

Speaker Connector - J14

PIN	DESCRIPTION
1	+5 VDC
2	Audio Signal

Reset Connector - J17

PIN	DESCRIPTION
1	RESET/
2	Ground

Table 8-3. Connector Pinouts (Sheet 15 of 15).

CONNECTOR	NO. PINS	FUNCTION
J1	8	Power Supply
J2	62	Option Use
J3	72	CRT Plug In Module (Integral Video Display Module Slot)
J4	62	Option Use
J5	72	8088 CPU/ROM/DRAM Module Slot
J6	25	RS-232C Serial I/O Port 2
J7	25	RS-232C Serial I/O Port 1
J8	5	Integral Printer
J9	5	Keyboard
J10	62	Option Use
J13	26	Disk Drive Signal Connector
J15	8	Disk Drive Power Connector
J16	10	CRT Signal and Power Connector
J17	2	Reset
J18	2	Fan
J11	7	Video Potentiometers (Contrast & Brightness)
J12	9	External Video Monitor
J14	2	Speaker

Table 8-4. Connectors Used On Motherboard.

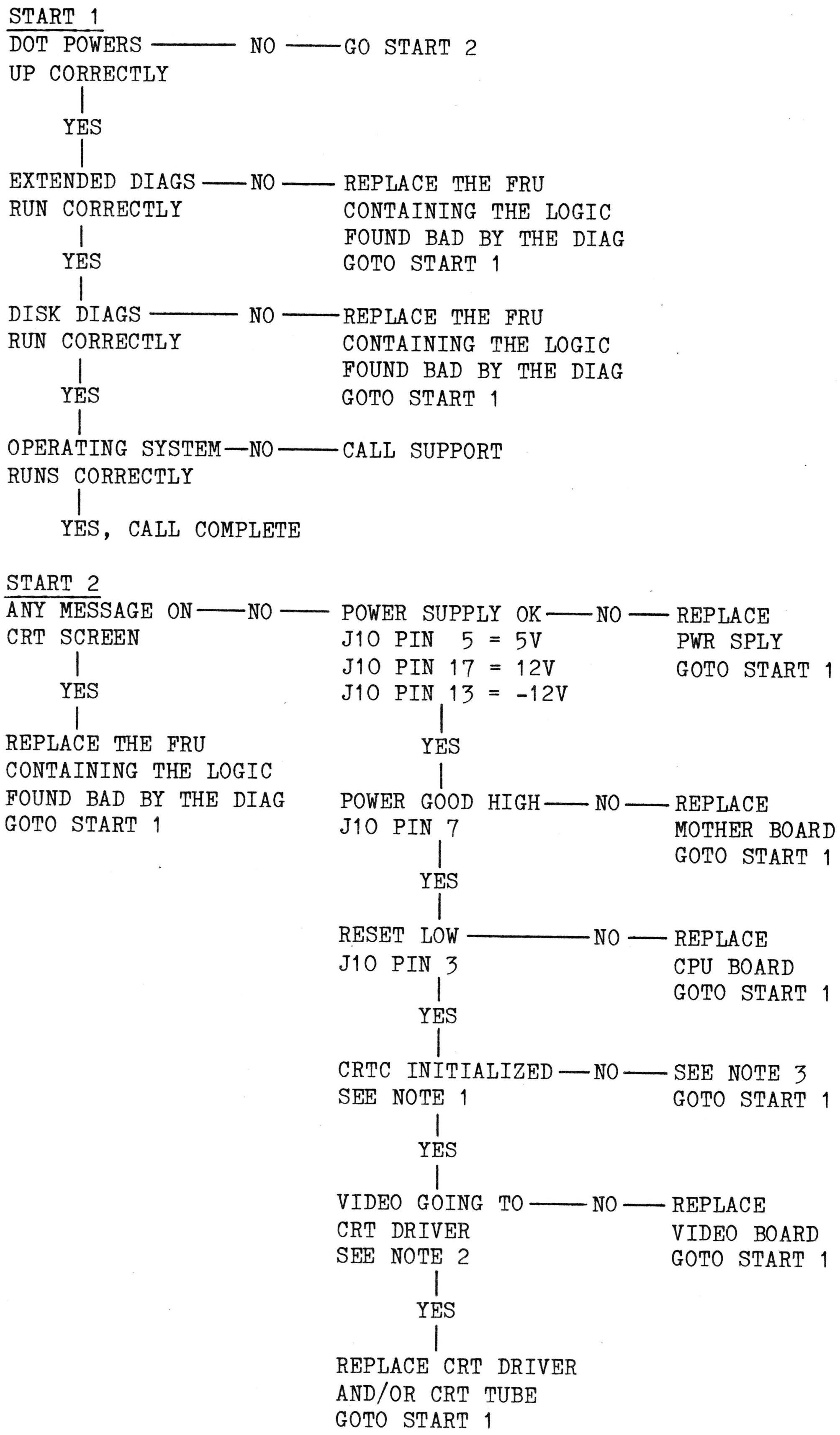

START 1
DOT POWERS UP CORRECTLY
NO
GO START 2
YES
EXTENDED DIAGS RUN CORRECTLY
NO
REPLACE THE FRU CONTAINING THE LOGIC FOUND BAD BY THE DIAG GOTO START 1
YES
DISK DIAGS RUN CORRECTLY
NO
REPLACE THE FRU CONTAINING THE LOGIC FOUND BAD BY THE DIAG GOTO START 1
YES
OPERATING SYSTEM RUNS CORRECTLY
NO
CALL SUPPORT
YES, CALL COMPLETE
START 2
ANY MESSAGE ON CRT SCREEN
YES
REPLACE THE FRU CONTAINING THE LOGIC FOUND BAD BY THE DIAG GOTO START 1
NO
POWER SUPPLY OK
J10 PIN 5 = 5V
J10 PIN 17 = 12V
J10 PIN 13 = -12V
NO
REPLACE PWR SPLY GOTO START 1
YES
POWER GOOD HIGH
J10 PIN 7
NO
REPLACE MOTHER BOARD GOTO START 1
YES
RESET LOW
J10 PIN 3
NO
REPLACE CPU BOARD GOTO START 1
YES
CRTC INITIALIZED
SEE NOTE 1
NO
SEE NOTE 3
GOTO START 1
YES
VIDEO GOING TO CRT DRIVER
SEE NOTE 2
NO
REPLACE VIDEO BOARD GOTO START 1
YES
REPLACE CRT DRIVER AND/OR CRT TUBE GOTO START 1

Table 8-5. Power Up Diagnostic Troubleshooting Chart (Sheet 1 of 2)

NOTE 1: IF YOU SUSPECT BUS PROBLEMS, CHECK TO SEE IF THE CRT CONTROLLER CHIP ON THE VIDEO BOARD IS BEING INITIALIZED BY DOING THE FOLLOWING PROCEDURE.

1. MONITOR THE VOLTAGE AT THE EXT MON CONNECTOR PIN 3
2. POWER UP THE DOT.
3. PRESS AND HOLD THE RESET BUTTON.
4. VOLTAGE SHOULD BE 0.13V.
5. RELEASE THE RESET BUTTON.
6. VOLTAGE SHOULD BE 0.35V.
7. THE ABOVE HAPPENING CORRECTLY EQUALS "YES".

NOTE 2: IF YOU SUSPECT THAT VIDEO INFORMATION IS BEING SENT TO THE CRT DRIVER BOARD BUT THE DRIVER BOARD OR CRT IS DEFECTIVE, DO THE FOLLOWING PROCEDURE.

1. MONITOR THE VOLTAGE AT EXT MON CONNECTOR PIN 1.
2. INSERT THE DIAGNOSTIC DISK IN DRIVE A.
3. POWER UP THE DOT.
4. WAIT 15 SECONDS FOR THE DIAGNOSTIC MONITOR TO LOAD.
5. TYPE F3 (SELECT INDIVIDUAL TEST).
6. TYPE F5 (SELECT VIDEO TEST).
7. VOLTAGE SHOULD VARY FROM 0.4V to 1.4V OVER THE NEXT 6 MINUTES THEN STABILIZE AT 0.55V.
8. THE ABOVE HAPPENING CORRECTLY EQUALS "YES".

NOTE 3: AT THIS POINT EITHER THE CPU OR VIDEO OR MOTHER BOARD IS DEFECTIVE. IT IS CURRENTLY IMPOSSIBLE TO DETERMINE WHICH BOARD IS BAD. SWAP THE BOARDS IN THE ORDER LISTED UNTIL THE MACHINE SUCCESSFULLY COMPLETES THE POWER UP SEQUENCE.

NOTE: FRU = FIELD REPLACEABLE UNIT.

Table 8-5. Power Up Diagnostic Troubleshooting Chart (Sheet 2 of 2).

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